

Cryptophorellia, a remarkable new genus of Afrotropical Tephritinae (Diptera: Tephritidae)

by

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ABSTRACT

Cryptophorellia, new genus, is proposed for *Phorellia peringueyi* Bezzi (type species), *P. phaeoptera* Bezzi and 15 additional species, of which 14 are described as new (*elongatula*, *flava*, *longicauda*, *madagascariensis*, *minuta*, *montana*, *munroi*, *prairiensis*, *stenoptera*, *stuckenbergi*, *tarsata*, *trivittata*, *vumbaensis*, *zombaensis*), and one is left unnamed. *Trypeta doris* Munro is a new junior synonym of *C. peringueyi*. All species are strictly Afrotropical ranging from 7° N to the Cape Peninsula. Eleven species are recorded from mainland Africa and six from Madagascar. Host plants, when known or suspected, belong to *Senecio* or *Crassocephalum* (Asteraceae). The larvae infest the flowerheads and drop to the ground prior to pupariation. Sexual dimorphism in wing shape and/or pattern is recorded for most species, with interspecific variation generally greater among the males, rendering them easier to separate. Conversely, for identification purposes male terminalia are almost useless, whereas the shape of the aculeus usually provides a good clue to species identity. The taxonomy, phylogeny, zoogeography, biology and immature stages of *Cryptophorellia* are briefly discussed. Separate keys for the identification of males and females are provided.

INTRODUCTION

Species of *Cryptophorellia*, gen. n., have been variously placed in *Forellia* Robineau-Desvoidy (*Phorellia*, emendation) (eg. Bezzi 1924a 1926) and *Trypeta* Meigen (eg. Munro 1939a b). Although Cogan & Munro (1980: 527) recognised that these species did not belong in either of these genera, they did not re-assign them. Instead, they catalogued them as an 'Undescribed Genus of Trypetinae'. A collection of African species accumulated by A. Freidberg, mostly during recent field work, and another collection, prepared by B. R. Stuckenberg in Madagascar and sent to D. L. Hancock for study, provided the stimulus to each of us individually to further study this genus. Although studying different groups of species, we independently reached the same conclusion that these species belong to an undescribed genus that contains many undescribed species in addition to the few described ones. We also recognise that this genus belongs in the Tephritinae, not in the Trypetinae. We then joined forces, obtained all available material from several museums, and embarked on a revision of the newly proposed genus.

We are indebted to the following museums and curators for the loan of material:
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 SAMC = South African Museum, Cape Town, South Africa (Dr V. B. Whitehead).
 USNM = National Museum of Natural History, Smithsonian Institution, Washington D.C., USA (Dr W. N. Mathis).
 TAU = Tel Aviv University, Tel Aviv, Israel.

TAXONOMY

Previously described species of *Cryptophorellia* were treated as trypetines primarily because of the generally banded wing pattern and the dark and acuminate cephalic and thoracic bristles. The genus, however, was recently referred to the *Sphenella* group within the tephritinae (as 'Genus A', Freidberg 1987) and included in a revised key to the genera comprising this group. Banded or reticulate-banded wing patterns also occur in other members of the *Sphenella* group, as do dark and acuminate cephalic and thoracic bristles (Freidberg 1987). So far as is known, all included genera are associated with plants of the genera *Senecio* or *Crassocephalum*. In the case of one host, *Senecio moorei* R. E. Fr., three species representing three genera of the *Sphenella* group (*Cryptophorellia*, *Sphenella* Robineau-Desvoidy and *Telaetes* Munro) were reared from its flowerheads. As currently understood, the *Sphenella* group contains 10 genera (Munro 1957, Freidberg 1987), and possibly also *Parafreutreta* Munro and *Acroneus* Munro (Freidberg, unpublished observations). Of these 12 genera (which together contain about 85 species) 7 are strictly Afrotropical, 3 occur in the Afrotropical as well as in other zoogeographical regions, and only 2 are not known to occur in the Afrotropical Region. About 85 % of the species are strictly Afrotropical. Based on this pattern of distribution, it is assumed that the center of origin of the *Sphenella* group was in the Afrotropical Region. More detailed observations on the distributions of the included taxa, especially those restricted to the Afrotropical Region, indicate that the exact center of origin of the entire group may be the area west of the Mozambique Channel. This area is the geographical center of both the taxa of the *Sphenella* group and their host plants.

The diagnostic characters shared by *Cryptophorellia* with other members of the group are: Frontal vitta setulose; 2 orbital and 2 frontal bristles; 4 (2 pairs) equal or subequal scutellar bristles; wing pattern banded or reticulate-banded; terga spotted; sternum 6 in male strap-like; epandrium ovate; distiphallus moderately to heavily sclerotised, with short vesica; aculeus with preapical 'shoulders'; associated with species of *Senecio* and *Crassocephalum* (Asteraceae).

Within the *Sphenella* group, *Cryptophorellia* is characterised by the following combination of characters: Head oval in profile, fronto-facial angle larger than 90°; frons longer than wide; gena with small fine setulae only; proboscis short, capitate;

all cephalic and thoracic bristles long, acuminate, curved and dark; dorsocentral bristles aligned slightly posterior of transverse suture or slightly anterior of anterior supra-alars; hind femur without a row of long anteroventral bristles; wing usually banded, or reticulate-banded, sexually dimorphic and paler in male; both sexes with M-shaped pattern or wing of male longitudinally banded, or with otherwise modified 'M'.

The position of *Cryptophorellia* within the *Sphenella* group is isolated. The characteristic M-shaped wing pattern is not known in related genera and is somewhat similar only to some species of *Mastigolina* Munro and *Telaletes*. The dark cephalic and thoracic bristles and the short proboscis are characters found in *Axiotauma* Munro and *Orthocanthoides* Freidberg, but these genera are otherwise very different from *Cryptophorellia*.

In the 'Catalogue of Afrotropical Diptera' (Cogan & Munro 1980:527), four species are assigned to *Cryptophorellia* (as 'Undescribed genus of Trypetinae'), namely, *brunithorax* Robineau-Desvoidy, 1830 from Mauritius, *doris* Munro, 1939 from South Africa, *peringueyi* Bezzi, 1924a described from South Africa but recorded also from Kenya and Uganda, and *phaeoptera* Bezzi, 1926 from South Africa. Orian (1962) referred *brunithorax* to the Pyrgotidae, and a study of the types of the other three species revealed that *doris* is a junior synonym of *peringueyi*, thus leaving only two described species within the new genus. All subsequent identifications of *peringueyi* that we checked from outside of South Africa were misidentifications. However, based on newly collected and reared material from Kenya, we found that this species does exist there and hence is probably the most widespread species of the genus. *C. peringueyi* is designated here as the type-species of *Cryptophorellia* since it is the most widespread and oldest described species in the genus, it is identifiable with relative ease, and has an available type specimen and known host plants.

The best character for recognising species of *Cryptophorellia* is the wing pattern. However, wing patterns of closely related species, especially in females, differ only slightly or are indistinguishable. Moreover, as most species are sexually dimorphic and the two sexes do not share the same species-specific diagnostic characters, it may be difficult to correctly associate the sexes, especially when only a few specimens of more than one species were collected at one locality. Collecting large series with host-plant associations would partially resolve this problem. In the present study, however, approximately 20 female specimens, mostly from Madagascar, remain unassigned to species, and the association of sexes in several other species is highly speculative (ie. based on collecting data). Six species are based on males only.

Most studied species were recorded from one country only, and the distribution of the genus appears disjunct (Fig. 58). This apparently restricted distribution may be genuine (as in the case of the Malagasy species), but on the other hand it may indicate serious gaps in our knowledge and the likelihood that many additional species still await discovery. This is especially true for Central and West Africa, where, west of Uganda, only a few specimens were available for study.

In the present revision, *Cryptophorellia* and its 17 species are described and illustrated, and separate keys for males and females are provided. Descriptions are

composite. For the most part, information given in the generic description is not repeated in the species description. Terminology follows McAlpine (1981) and Freidberg & Mathis (1986). The following additional ratio is used: Wing ratio = length of wing : width of wing (flattened wings measured; allowing $\pm 5\%$ variation). Terminology referring to the wing pattern of *Cryptophorellia* is detailed in the generic description.

To facilitate use by the reader, the species are treated in three assemblages that have at least some phylogenetic standing (see 'Phylogeny and distribution'): (i) species from southern Africa, containing all five species known from this area (Malawi, Zimbabwe and South Africa), including *C. peringueyi* and *C. zombaensis* which extend as far north as Kenya; (ii) species from equatorial Africa, containing six species known exclusively from this area; and (iii) species from Madagascar, containing six species known only from this island. Apart from *C. peringueyi* and *C. phaeoptera*, the first two treated species which were named previous to this study, the other species, all new, are arranged alphabetically in their respective groups.

***Cryptophorellia* gen. n.**

Forellia (*Phorellia*), *Trypeta* (in part).

Undescribed genus of Trypetinae; Cogan & Munro, 1980: 527 (catalogue).

Undescribed genus A; Freidberg, 1987: 558.

Type species: *Trypeta peringueyi* Bezzi, by present designation.

A genus of trypetine-like species, with all major cephalic and thoracic bristles dark and with the shape and pattern of the wing more or less distinctly sexually dimorphic; wing pattern usually banded, M-shaped.

Description:

Head (Fig. 1): Coloration: head and appendages dull yellow, with frons, antenna and apex of palpus darker; ocellar spot and usually a large V-shaped spot on dorsal postcranium black, but dorsal postcranium sometimes almost entirely black; postcranium, ocellar triangle, vertical plates and orbits distinctly grey microtomentose; ventral facial margin laterally shiny; thin part of arista brown to black; brown spot lateral of base of antenna more or less distinct. Frontal vitta with fine yellowish to blackish setulae; setulae on other parts of head usually pale yellowish. Structure: Head 1,25–1,50 higher than long; fronto-facial angle 120° – 135° , usually rounded, rarely projected; frontal-head ratio usually 0,45–0,50; frons about as long as wide, slightly narrowed anteriorly; parafacial linear; gena about as high as antenna; face flat or slightly concave; lower facial margin slightly projected; lower margin of head usually distinctly raised anteriorly; eye oval, slightly higher than long; antenna slightly shorter than face; 1st flagellomere about 1,5 times as long as high, apex rounded; arista with short hairs; proboscis capitate; palpus spatulate, without overt features; occiput uniformly convex below, slightly concave above; chaetotaxy as follows: 2 orbital bristles, 2 frontals, ocellar about as long as frontal, postocellar, inner and outer vertical and postoculars well developed; all these bristles acuminate and most of them blackish; postoculars brownish.

Thorax: Coloration: In dark specimens ground colour black, with notopleural area more or less yellowish; microtomentum dense, more brownish on scutum, more

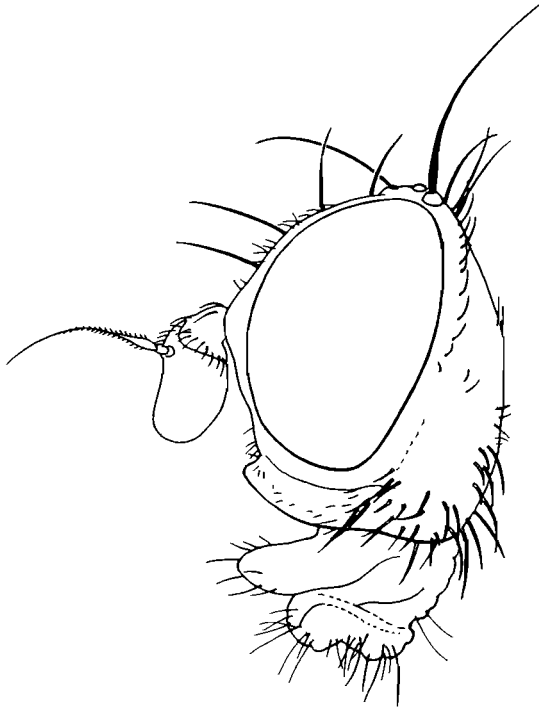
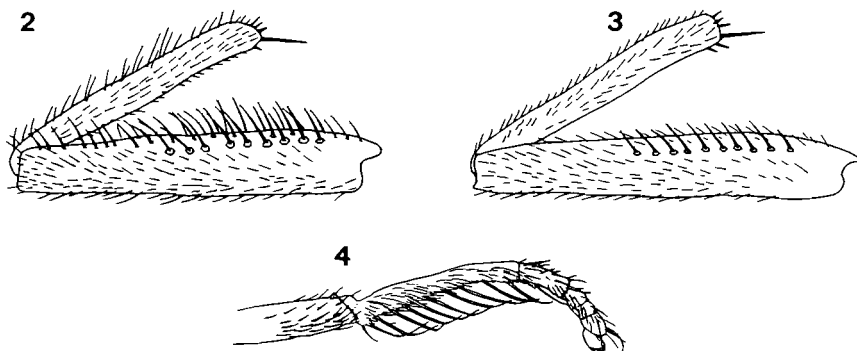


Fig. 1. *Cryptophorellia elongatula* sp. n., head, profile.

greyish or yellowish on pleura; distinct transverse brown bands present at level of dorsocentral bristles and along border of scutellum, but sometimes entire post-sutural area appears brown; blackish spots present around bases of presutural, dorsocentral, prescutellar, anterior supra-alar and intra-alar bristles; basal half of scutellum blackish, apical half yellow; subscutellum and mediotergite black, with dense grey microtomentum. In paler specimens ground colour increasingly yellow, until, in extreme cases, entire thorax is yellow; concurrently microtomentum appears paler, becoming almost invisible in extremely pale specimens; setulae on scutum yellowish with brownish sheen to rather dark brown, coloration of setulae usually varying in accordance with ground colour of scutum; pleural setulae yellowish, setulae on scutellum sparse, yellowish to brownish; calypteres and halter yellowish. Structure: Chaetotaxy complete; anterior edge of scutum with row of short, pale, erect bristles, among which median scapular pair usually prominent; all other major bristles dark; dorsocentral bristles transversely aligned slightly posterior of suture to slightly anterior of anterior supra-alars; anepisternum usually with 2 dark bristles, although ventral one is usually considerably shorter and often paler, sometimes indistinguishable from rest of pale bristles; scutellum very slightly convex, with 4 subequal setae; ventral calypter narrow.

Legs: Yellow, with yellowish to brownish setulae; shape normal; in some species midfemur of male anteriorly with 3 longitudinal rows of rather similar, erect



Figs 2-4. *Cryptophorellia* spp., legs. 2. *C. montana* sp. n., midfemur and midtibia, anterodorsal view. 3. *C. prairiensis* sp. n., midfemur and midtibia, anterodorsal view. 4. *C. peringueyi* (Bezzi), hind tarsus, anterior view.

bristles, and midtibia anteriorly with 2 longitudinal rows of erect or semi-erect setulae (midleg of the erect-bristles type—Fig. 2); in other species and in females of all species midfemur with only anterodorsal row of bristles (3-13) erect and prominent, other rows being appressed, and midtibia with appressed setulae (midleg of the appressed-bristles type—Fig. 3); hind tarsus rarely with setal ornamentation (Fig. 4).

Wing: Usually of normal shape (with wing ratio about 2,4-2,6), but sometimes (in males of some species) unusually elongate (wing ratio 2,7-3,6); venation typical for subfamily; longitudinal veins generally straight; pterostigma about twice as long as wide at base (in male of *C. stenoptera* about 3 times as long as wide); veins R_{4+5} and M usually parallel, sometimes slightly curved posteriorly or slightly convergent

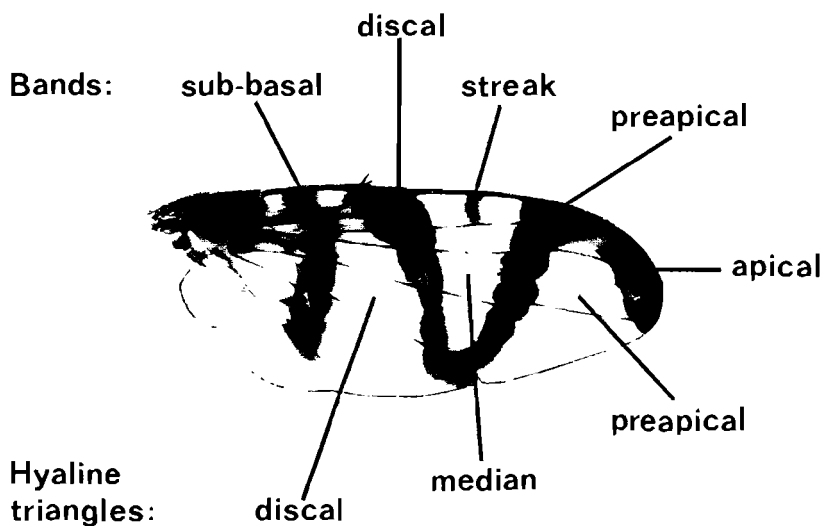


Fig. 5. *Cryptophorellia* sp., wing, with terminology of dark bands and hyaline triangles.

distally; vein M ratio (length of ultimate section of vein M: length of penultimate section) usually 1.8–2.0, but much greater in species with unusually elongate wings; crossvein r-m placed slightly beyond middle of cell dm; crossveins r-m and dm-cu divergent anteriorly; cell cup with a short and wide point; vein R_1 setulose dorsally (without an interruption) and ventrally at apex; vein R_{4+5} sparsely setulose dorsally almost to apex, with about 20 setulae (range: 12–26), ventrally with several setulae to crossvein r-m; 2 distinct costal spines present; wing entirely microtrichose, in most species with dark transverse and oblique bands forming a pattern resembling the letter M; in some species (especially males) orientation of bands is more longitudinal, or pattern may even become reticulate-banded. Most species sexually dimorphic regarding wing pattern, males generally having a more diffuse and lighter pattern, and 'M' less distinct (especially when viewed under magnification). The 4 bands comprising the 'M' (Fig. 5), or their equivalents, are termed in this work (from base to apex) 'sub-basal', 'discal', 'preapical' and 'apical' (Steyskal 1979); between them 3 hyaline triangles ('discal', 'median', 'preapical') are usually present; in addition, there is a short, dark 'streak' across cell r_1 , midway between discal and preapical bands; this streak free in all females and in some males, but is fused to preapical band or embedded in relatively dark background in males of some species.

Abdomen: Coloration: In extremely dark specimens ground colour completely black, usually with well-defined posterior bands of silvery microtomentum on individual terga, often also laterally and medially. In paler specimens ground colour of microtomentose regions becomes increasingly yellow, until the black areas shrink into pairs of lateral spots, eventually disappearing altogether, resulting in an entirely yellow abdomen; setulae yellowish to brownish, usually in accordance with ground colour. Structure: T6 of female slightly shorter than T5. Terminalia ♂: Extremely uniform throughout genus and therefore of little use in distinguishing species. Epandrium in posterior view (Fig. 6) almost rounded, broadest below midheight; with outer surstyli wide and strongly curved mesally; mesal preniseta slightly larger than external one, but otherwise similar; epandrium generally triangular in lateral view and somewhat variable interspecifically (Figs 7–14);

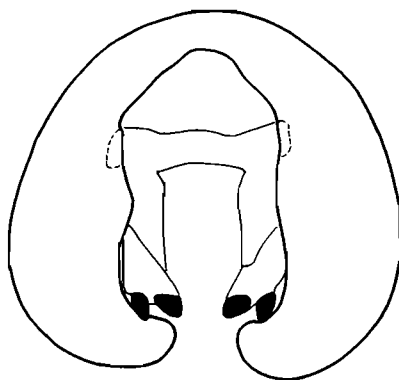
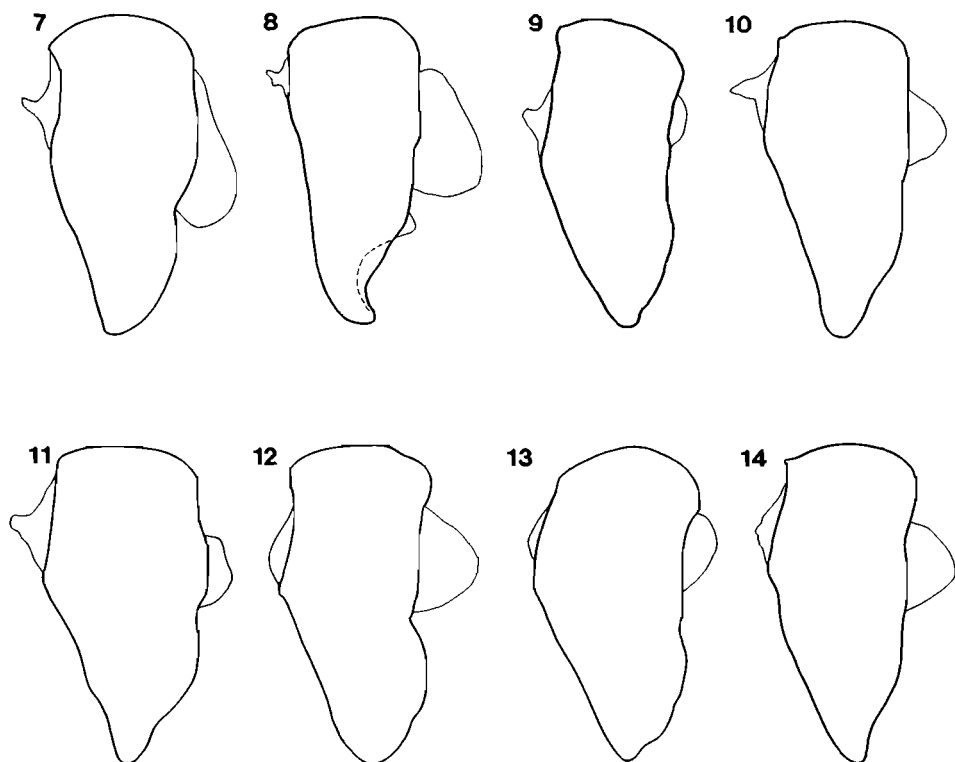


Fig. 6. *Cryptophorellia minuta* sp. n., epandrium, posterior view.



Figs 7-14. *Cryptophorellia* spp., epandrium, lateral view. 7. *C. peringueyi* (Bezzi). 8. *C. phaeoptera* (Bezzi). 9. *C. vumbaensis* sp. n. 10. *C. flava* sp. n. 11. *C. longicauda* sp. n. 12. *C. elongatula* sp. n. 13. *C. minuta* sp. n. 14. *C. stuckenbergi* sp. n.

basiphallus long, coiled; distiphallus (Fig. 15) quite heavily sclerotised, with a membraneous vesica containing a sclerotised tubercle or spine, practically identical in all males studied. ♀: Oviscape usually shiny black with brownish to blackish setulae; in specimens with yellow oviscape setulae yellowish; oviscape conical, but often flattened in pinned specimens; the tergal-oviscapal measure (number of terga immediately preceding oviscape with combined length equal to length of oviscape) varies from 1,5 to 3,5, but in most species is around 2; rasper not studied; aculeus uniform in general facies but varies in length and proportions interspecifically, and especially in details of apical, pointed portion (in the absence of a thorough study of the structure of the aculeus in Tephritidae, the terminology used for it in this paper is merely descriptive and temporal (Fig. 16), and will eventually have to be revised. When comparing a specimen with the species descriptions, it must be done in conjunction with the illustrations, if identification is to be achieved); greater basal part (0,65-0,80 of entire length) is generally parallel-sided; more distally aculeus tapers more or less gradually forming a narrow 'neck' just before preapical setulae (sensilla), from here it is again parallel-sided, or tapers still, or widens somewhat until reaching preapical 'shoulders'; beyond the 'shoulders' is the apex

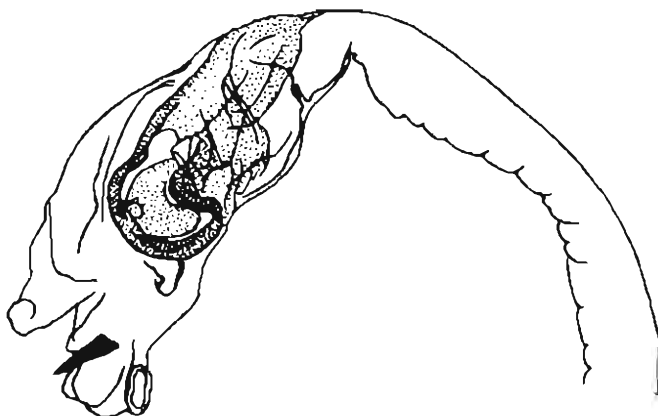
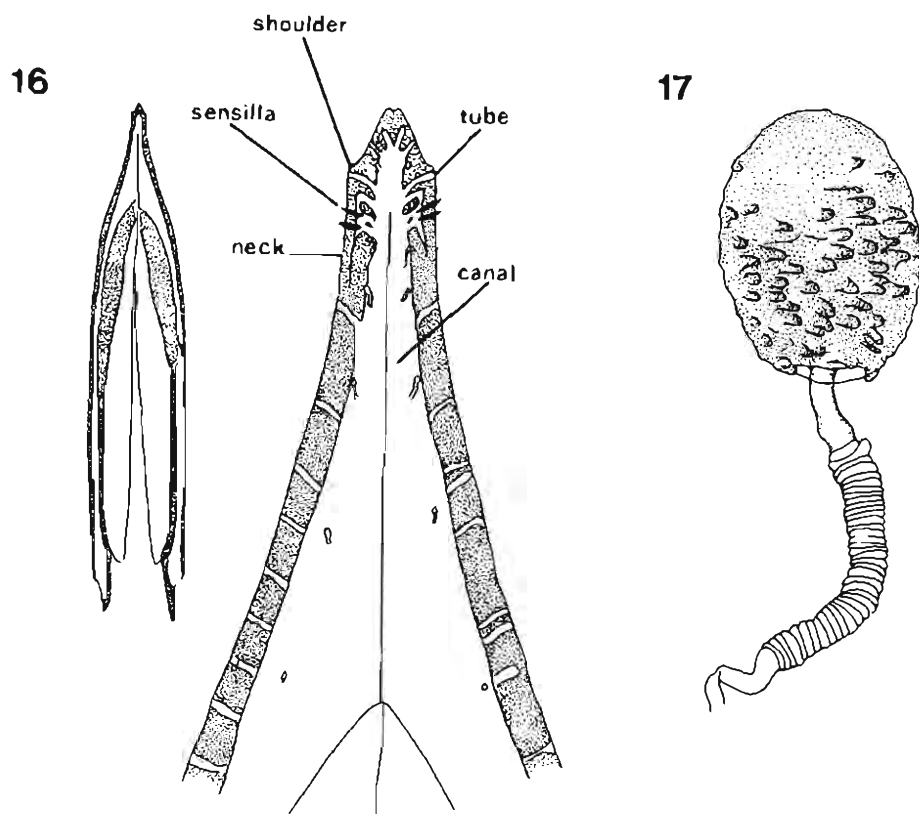


Fig. 15. *Cryptophorellia minuta* sp. n., distiphallus.



Figs 16–17. *Cryptophorellia* spp., ♀ terminalia. 16. *C.* sp., aculeus (whole and apex), with terminology of some parts. 17. *C. flava* sp. n., spermatheca.

which in some species is more or less distinctly notched. Aculeus, especially its apical part, can be divided into a central 'canal' (white in illustration) and darker margins, latter traversed by irregularly spaced 'tubes' and by preapical setulae. Relative widths of 'canal' and margin, although not measured precisely, is a good specific character. Generally aculeus is treated in specific descriptions from base to apex. Spermathecae (Fig. 17) 2, black, ovate, with tuberculate surface and practically without interspecific variation.

Etymology: Greek *Cryptos*—hidden, plus *Phorellia*—an old generic name used for species of this genus, referring to the convergence between the two genera. Gender feminine.

Key to females

- 1 The 3 basal-most transverse bands of wing connected by longitudinal band over vein M and anterior part of cell dm; pattern reticulate-banded, almost uniformly black (Fig. 31) (South Africa) **phaeoptera** Bezzi
- Transverse bands not connected by longitudinal band; pattern banded, coloration variable 2
- 2 Wing pattern dark and cohesive, that is, 4 major transverse bands uninterrupted and united (sub-basal and discal bands usually connected through a lighter area), forming a serpentine band resembling the letter M (all Madagascar species + 1 African mainland species) 3
- Wing pattern with extensive lightly coloured areas (greyish or yellowish) and distinctly interrupted in cell dm and usually also at end of vein R_{2+3} 6
- 3 Transverse wing bands condensed (Fig. 52); hyaline triangles at most slightly wider than bands; sub-basal band reaching hind margin although sometimes faintly (check with incident light); wing ratio 2,38; aculeus (Fig. 27) with slightly notched apex (Madagascar) **prairiensis** sp. n.
- Transverse bands less condensed; hyaline triangles (especially preapical) distinctly wider than bands; sub-basal band usually not reaching hind margin; wing ratio variable; apex of aculeus not notched 4
- 4 Aculeus tapered distally throughout (Fig. 21), without distinct 'neck'; 'shoulders' weakly developed; 'canal' at level of setulae distinctly wider than margins; preapical hyaline wing triangle very wide, its width along vein M about 3 times as wide as preapical band (Fig. 35); wing ratio 2,56; vein M ratio 2,1–2,8. (Zimbabwe, Malawi) **vumbaensis** sp. n.
- Aculeus widened before apex, with distinct 'neck' and 'shoulders'; 'canal' at level of setulae slightly wider or much narrower than margin; preapical hyaline triangle narrower; wing ratio variable; vein M ratio less than 2 (Madagascar) 5
- 5 Smaller species (wing length: 3,1–4,4 mm); Aculeus: (Fig. 26) apex pointed; 'canal' apically much narrower than margin **minuta** sp. n.
- Larger species (wing length: 4,2–4,5 mm); Aculeus: (Fig. 28) apex slightly rounded; 'canal' apically slightly wider than margin **stenoptera** sp. n.
- 6 Preapical and apical bands distinctly united at least through a lighter area (Fig. 37); preapical band more oblique, and preapical hyaline triangle wider;

ultimate section of vein M longer than preceding 2 sections combined; aculeus relatively wide, with rather rounded apex (Fig. 22) (Malawi, Kenya ?)

zombaensis sp. n.

- Preapical and apical bands not united; preapical band less oblique, and preapical hyaline triangle narrower; ultimate section of vein M shorter than combined length of preceding 2 sections; aculeus different 7
- 7 Tergal-oviscapal measure usually 2,5 or above (East and West Africa).... 8
- Tergal-oviscapal measure usually less than 2,3 (East and South Africa) ... 9
- 8 Ground colour of scutum predominantly black; terga often with complete dark bands; tergal-oviscapal measure 3,0–3,5, aculeus (Fig. 24) somewhat arrow-like, more elongate (length : width ratio 6,5), with prolonged 'neck'; (Kenya, Uganda, Nigeria) **longicauda** sp. n.
- Ground colour of scutum predominantly yellow; terga with dark lateral spots; tergal-oviscapal measure 2,3–2,5; aculeus (Fig. 23) less elongate (length : width ratio 4,5), with shorter 'neck' (Kenya, Uganda, ex. *C. vitellinum*) **flava** sp. n.
- 9 Aculeus (Fig. 25) notched at tip. (Kenya; associated with *C. montuosum*). **montana** sp. n.
- Aculeus pointed at tip 10
- 10 Larger species; wing length 3,4–5,0 mm; aculeus (Fig. 18) more elongate (length : width ratio 6), with more attenuate apical part (South Africa, Zimbabwe, Kenya; associated with *Sevecia* spp.) **peringueyi** Bezzi
- Smaller species; wing length 3,0–3,6 mm; aculeus (Fig. 20) less elongate (length : width ratio 4,2), with less attenuate apical part (South Africa) **munroi** sp. n.

Key to males

- 1 Midfemur at about basal $\frac{1}{2}$ with a prominent row of erect, anterodorsal bristles (3–13) easily distinguishable from otherwise appressed vestiture of femur; midtibia with rather appressed vestiture (Fig. 3) (all Madagascar and some African species)..... 2
- Midfemur with 3 rows of erect, anterior bristles almost throughout its length, all rather similar and not easily distinguishable from each other; midtibia anteriorly with 2 rows of semi-erect setulae (Fig. 2) (mainland Africa)... 11
- 2 Wing unusually elongate; wing ratio 3,54; vein M ratio 4,0 (Fig. 55) (Madagascar) **stenoptera** sp. n.
- Wing and ratios different..... 3
- 3 Wing bands arranged predominantly along longitudinal veins (Figs 48, 51); wing ratio 2,75–3,00 (Madagascar) 4
- Wing bands predominantly transverse; wing ratio usually less than 2,75... 5
- 4 Ultimate section of vein M within longitudinal yellow band at least along basal half (Fig. 48); wing ratio 2,75; larger species, wing length 5,0–5,4 mm **elongatula** sp. n.
- Ultimate section of vein M not within longitudinal yellow band, only basally within band over crossvein dm-cu (Fig. 51); wing ratio 3,00; smaller species, wing length 3,3–4,2 mm..... **minuta** sp. n.

- 5 A complete yellow band over vein CuA_1 ; wing pattern almost uniformly yellow, without blackish spots (Fig. 53) (Madagascar)..... **prairiensis** sp. n.
— Pattern different 6
- 6 Wing pattern more or less uniformly blackish, banded-reticulate; cell dm almost entirely blackish, except 1 or 2 small hyaline indentations postero-medially (Fig. 32) (South Africa) **phaeoptera** Bezzi
— Wing pattern at least partly yellow, banded; cell dm predominantly hyaline or yellowish..... 7
- 7 Wing pattern mainly light and diffuse yellow, with small, conspicuous blackish areas over basal crossveins and crossvein dm-cu posterior to distal end of cell dm, and at apex between ends of veins R_{2+3} and M (Fig. 38) (Malawi, Kenya ?) **zombaensis** sp. n.
— Wing pattern usually predominantly brownish or blackish, sometimes almost uniformly yellow, in either case without such an arrangement of distinct blackish areas..... 8
- 8 Apical band separate from preapical band or very narrowly connected to it at end of vein R_{2+3} (Fig. 34); small species, wing length 3,0–3,1 mm (South Africa)..... **munroi** sp. n.
— Apical band connected to preapical band usually through the entire width of cell r_{2+3} ; size variable 9
- 9 Wing pattern almost uniformly blackish (Fig. 36), with preapical hyaline triangle about as wide as discal and median triangles combined (all measured along vein M); wing ratio 2,72; vein M ratio 2,0–2,6 (Zimbabwe, Malawi) **vumbaensis** sp. n.
— Wing pattern almost uniformly brownish yellow; other characters variable (Madagascar)..... 10
- 10 Apical band of wing widely connected to preapical band; connection extends into cell r_{4+5} about $\frac{1}{3}$ width of cell; preapical hyaline triangle about as wide as other triangles combined (all measured along vein M) (Fig. 49) **madagascariensis** sp. n.
— Connection between apical and preapical bands narrower, not extending into cell r_{4+5} ; preapical hyaline triangle narrower (Fig. 56) .. **stuckenbergi** sp. n.
- 11 First 1–2 tarsomeres of hind leg ventrally with comb of long whitish bristles about twice as long as width of tarsomeres (Fig. 4); colour of cell dm variable (equatorial and southern Africa) 12
— Hind tarsus without comb; wing pattern, including cell dm, entirely or predominantly yellow (equatorial Africa) 13
- 12 Bristles of tarsal comb curved near tip at almost a right angle (Fig. 4); wing pattern more contrasting, forming interrupted but distinct 'M' (Fig. 30) (South Africa, Zimbabwe, Kenya) **peringueyi** Bezzi
— Bristles of tarsal comb straight; wing pattern less contrasting, forming uninterrupted but indistinct 'M' (Fig. 45) (Uganda)..... **tarsata** sp. n.
- 13 Wing pattern with 3 blackish transverse bands (sub-basal, preapical and apical) and incomplete yellow band (discal); preapical and apical bands isolated (Fig. 46); body entirely yellow (Kenya)..... **trivittata** sp. n.
— Wing pattern more or less uniformly yellowish or brownish, with an uninter-

- rupted, though sometimes somewhat modified 'M' (better detected by unaided eye); preapical and apical bands more or less clearly connected; body coloration variable 14
- 14 Darker species; pleura, especially katepisternum and anepimeron blackish; terga predominantly black; wing pattern, except yellow anteromedial part, brownish black (Fig. 44) (Kenya, associated with *C. montuosum*) **montana** sp. n.
- Paler species; pleura and terga predominantly or entirely yellow; wing pattern predominantly yellow 15
- 15 Wing pattern more contrasting with hyaline background; cell dm with single distinct hyaline spot apically (Fig. 47) (Tanzania) unnamed species
- Wing pattern less contrasting with background, which is yellowish hyaline; cell dm with either no distinct hyaline spots or with 2 such spots. 16
- 16 Ground colour of scutum predominantly black; in incident light wing more uniformly golden-yellow, with hyaline areas more restricted and less contrasting, and with cell dm entirely (though not always uniformly) yellow (Fig. 42) (Kenya, Uganda, Nigeria) **longicauda** sp.n.
- Ground colour of scutum predominantly yellow; in incident light wing more contrastingly brown, golden-yellow and hyaline, with the discal hyaline triangle traversing basal half of cell dm, and median hyaline triangle penetrating into apical half of cell dm (Fig. 40) (Kenya, Uganda) (ex. *C. vitellinum*) **flava** sp. n.

Southern African Species

Cryptophorellia peringueyi (Bezzi), **comb. n.**

(Figs 4, 7, 18, 29–30, 60)

Phorellia peringueyi Bezzi, 1924a: 488, Pl. XIII, Fig. 37; 1924b: 111 (in key); Munro, 1925: 51 (biological note); 1929: 13 (biological note). '*Phorellia*' *peringueyi*; Hancock, 1986: 32 (Zimbabwe record).

Trypeta peringueyi; Munro, 1935: 48 (biological note); 1939b: 10 (description of male).

'*Trypeta*' *peringueyi* Munro, 1960: 406 (Record from Lesotho (=Basutoland) and taxonomic note).

Trypeta doris Munro, 1939a: 41–42. **syn. n.**

doris Munro and *peringueyi* Bezzi—under 'Undescribed genus of Trypetinae'. Cogan & Munro, 1980: 527.

Diagnosis: Species with slightly sexually dimorphic wing pattern; 'M' rather distinct in ♂; ♂ hind tarsus with comb of long, curved, whitish bristles; tapered part of aculeus attenuate; body coloration highly variable.

Description: As in generic description, but with following details.

Wing length: 3,4–5,0 mm.

Colour: Varies considerably, from very dark (Kenya specimens), with only traces of yellow on terga to rather pale (Pretoria specimens), with predominantly yellow thorax and entirely yellow abdomen.

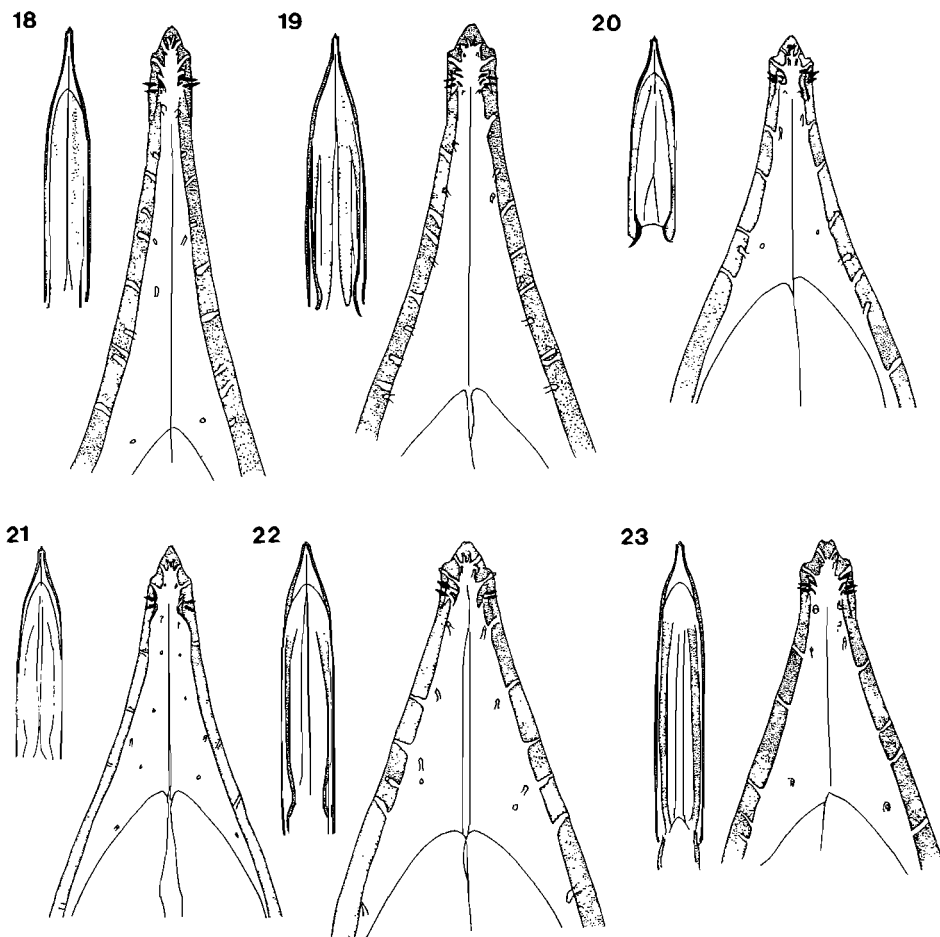
Legs: ♂ Midleg of erect-bristles type; ♂ hind metatarsus with ventral comb of long whitish bristles (Fig. 4), each about twice as long as tarsomere's width and curved near tip at almost a right angle; 1 or 2 such bristles also found on 2nd tarsomere.

Wing (Fig. 29): ♀: Base of wing greyish; 'M' mostly greyish black, interrupted twice at costal margin, where sub-basal and apical bands join the central 'V', and at discal band, especially in cell dm and around crossvein r-m, where band is yellowish; preapical band often with a 'tooth' distally in cell r_{2+3} (especially East African specimens); apical band isolated, reaches vein M or extends slightly into cell m; hyaline triangles contain grey triangles more centrally and bands or spots of white microtrichia peripherally, better seen in incident light. Wing ratio: 2,44. ♂ (Fig. 30): generally similar to ♀, with 'M' distinct, interrupted at same places, but preapical and apical bands often connected by yellowish area in cell r_{2+3} or a blackish connection along vein R_{4+5} ; the latter connection is often represented by small dark spot in cell r_{4+5} ; 'streak' often connected to preapical band. Wing ratio: 2,50.

Terminalia: ♂ (Fig. 7): Epandrium gently convex posteriorly, but with slight constriction about mid-height, rather pointed ventrally. ♀ Tergal-oviscapal measure 2,25–2,50, in one specimen 3,00; aculeus (Fig. 18): 'neck' very narrow and attenuate; 'shoulders' moderately prominent; 'canal' at narrowest place about as wide as margin; apex pointed.

Material examined: Holotype ♀, SOUTH AFRICA: Cape Town, Sep. 1913, G. Peringuey / '*Phorellia peringueyi* n.sp., typ ♀' [Bezzi's handwriting] (abdomen dissected, in microvial attached to pin) (SAMC). Additional specimens: SOUTH AFRICA: *Transvaal*: Pretoria, 2/8.xi.1930 (1 ♂ NCIP, also labelled: 'Holotype, *Trypeta doris* Mro, det H. K. Munro 1939'), (2 ♂ NCIP & BMNH, also labelled: '*Trypeta peringueyi* (Bez.) det H. K. Munro 1935') 4/10.xi.1930 (1 ♂ 1 ♀ NCIP), xi.1930 (3 ♂ 3 ♀ NCIP, some with associated puparia), 3/14.xi.1930 (1 ♀ BMNH), all collected by H. K. Munro; Petronella, xi.1926, H. K. Munro (1 ♂ NCIP), xi.1928, H. K. Munro (1 ♂ 2 ♀ NCIP). *Natal*: St. Lucia Park, 7–8.x.1983, A. Freidberg (1 ♀ TAU); Van Reenen, Drakensberg, 1–22.i.1927, R. E. Turner (1 ♀ BMNH); Karkloof, 25.ix.1983, A. Freidberg (1 ♀ TAU); Pietermaritzburg, Ukulinga Stat., 3.x.1983, A. Freidberg (1 ♀ TAU); *Cape Province*: W. Cape, 10 km SE Vanrhynsdorp, 3118DA, 14.x.1977, R. M. Miller (1 ♀ NMSA); East London, 7.v.1923, H. K. Munro (1 ♀ also labelled: '*Phorellia peringueyi* n.sp. ♀' (Bezzi's handwriting)); Jeffreys Bay 3424 BB, 2.xi.1978, R. Miller & J. Londt (1 ♂ 1 ♀ NMSA); Katberg, 4 000 ft, x.1932, R. E. Turner (1 ♂ BMNH); Mossel Bay, 28.iii.1939, R. E. Turner (1 ♀ BMNH); Cape Pen., Cape Town to Cape Point, 6–13.xi.1930, H. W. Simmonds (1 ♀ BMNH). ZIMBABWE: Mazoe, 22–29.v.1980, D. Miller (1 ♀ NMB). KENYA: Mt. Elgon, 3 500 m, 31.x.1983, A. Freidberg, ex. flowerhead ?*Crassocephalum* sp. (2 ♀ TAU); Mt. Elgon, 3 400 m, 25.xi.1986, A. Freidberg, ex. flowerhead *Senecio snowdenii*, xii.1986 (5 ♂ 6 ♀ TAU); Abardare, 3 000–4 000 m, 1.xii.1986, A. Freidberg (26 ♀ TAU); same collecting data, ex. flowerhead *Senecio moorei*, xii.1986 (26 ♂ 18 ♀ TAU); Abardare, 15–18.i.1972, A. Freidberg (1 ♀ TAU). The latter specimen is questionably identified as this species.

Biology and host plants: Almost everything known about the biology of *Cryptophorellia* is based on Munro's observations of this species, which are summarised later in this paper. The species has been reared from four species of plants: *Senecio*



Figs 18–23. *Cryptophorellia* spp., aculeus (whole and apex). 18. *C. peringueyi* (Bezzi). 19. *C. phaeoptera* (Bezzi). 20. *C. munroi* sp. n. 21. *C. vumbaensis* sp. n. 22. *C. zombaensis* sp. n. 23. *C. flava* sp. n.

erubescens Aiton and *S. madagascariensis* Poiré in South Africa, and *S. moorei* Fr. and *S. snowdenii* Hutch. in Kenya. The species of ?*Crassocephalum*, recorded above as a host plant, is probably a misidentification of *S. snowdenii*. An illustration of the puparium (Fig. 60) is given in the chapter dealing with the immature stages.

Cryptophorellia phaeoptera (Bezzi), **comb. n.**

(Figs 8, 19, 31–32)

Phorellia phaeoptera Bezzi, 1926: 284; Munro, 1926: 24 (biological note).

phaeoptera—under 'Undescribed genus of Trypetinae'. Cogan & Munro, 1980: 527.

Diagnosis: Dark species with reticulate-banded wing pattern composed of black, modified 'M' and conspicuous grey areas in discal and preapical hyaline triangles;

sub-basal and discal bands connected along vein M; ♀ wing pattern somewhat more reticulate than ♂.

Description: As in the generic description, but with the following details.

Wing length: 3,5–4,6 mm.

Colour: Extremely dark, with slight variation; pleura sometimes partly and irregularly yellowish; terga lacking distinct microtomentum, yellow hind margins slightly developed.

Legs: ♂ Midleg of appressed-bristles type.

Wing: ♀ (Fig. 31): pattern reticulate-banded, blackish, with 'M' modified and not easily recognisable; base of wing blackish; first 3 bands wide, somewhat irregular, connected to each other through a black band extending along most of cell dm and bordering section of vein M; discal hyaline triangle in form of 2 spots, sometimes united, usually not quite reaching hind margin of wing and only extending as far as middle of cell dm, but more basal spot sometimes united with hyaline band from apex of cell c forming complete hyaline band across wing; median hyaline triangle short, not quite reaching vein M, but apex of cell dm sometimes with 2 small hyaline spots; preapical hyaline triangle large, but irregular and containing dark grey triangle connected to apical band; apical and preapical bands usually narrowly disconnected; pterostigma entirely blackish; axillary lobe in apical $\frac{2}{3}$ infusate. Wing ratio: 2,46. ♂ (Fig. 32): Similar to ♀ but appearing more banded due to coalescence of hyaline spots; bands narrower than in ♀; discal hyaline triangle in form of single oval spot; preapical hyaline triangle often squarish; apical band narrowly connected to preapical band. Wing ratio: 2,42.

Terminalia: ♂ (Fig. 8): Epandrium straight posteromedially, concave below, with narrow ventral part curved posteriorly. ♀: Tergal-oviscapal measure 1,5–2,0; aculeus (Fig. 19): 'neck' rather narrow; 'shoulders' rather prominent; 'canal' about 1,5 times as wide as margin; apex indistinctly notched.

Material examined: Holotype ♀, SOUTH AFRICA: *Cape Province*: East London, 16.iv.[19]25, H. K. Munro / '*Phorellia phaeoptera* n.sp. typ ♀' (NCIP). Additional specimens: *Natal*: 9 km S & 6 km W of Rietvlei, Karkloof Forest, 1 525 m, 21–25.ii.1978, D. & M. Davis & B. Akerbergs (3 ♂ 4 ♀ USNM TAU); *Cape Province*: Hogsback, Amatola Mts. viii.1953, J. S. Taylor (1 ♂ 3 ♀ 3 puparia NCIP); E. Cape, 2 km S. Hogsback, 15.i.1983, R. Miller & P. Stabbins (1 ♀ NMSA).

Biology and host plants: Three typical puparia were examined that were associated with adults from Hogsback. Unfortunately no data about the host plant were given.

***Cryptophorellia munroi* sp. n.**

(Figs 20, 33–34)

Diagnosis: Small species with barely distinct sexual dimorphism in wing pattern; 'M' interrupted but distinct.

Description: As in the generic description, but with following details.

Wing length: 3,0–3,6 mm.

Colour: Rather variable, from predominantly blackish thorax and abdomen to predominantly yellowish; yellow hind margins and microtomentum on terga apparently always well developed on terga (in some specimens obscured by staining from inside of abdomen).

Legs: ♂ Midleg appears intermediate between erect-bristles and appressed-bristles types; additional material needed to clarify this point.

Wing: ♂ (Fig. 34) and ♀ (Fig. 33) with practically same wing shape and pattern, although 'M' of ♂ pattern somewhat less contrasted with background; base of wing hyaline or very lightly greyish; 'M' broken into 4 bands, places of interruption at apex of cell c and base of pterostigma, at posterior part of discal band, and at end of vein R_{2+3} ; hyaline triangles with more or less distinct greyish triangles. Wing ratio: 2,60.

Terminalia: ♂: Epandrium as in *C. peringueyi* but less convex posteriorly. ♀: Tergal-oviscapal measure 1,5; aculeus (Fig. 20): 'neck' rather wide: 'shoulders' prominent; 'canal' at narrowest place about as wide as margin; apex pointed.

Material examined: Holotype ♂, SOUTH AFRICA: *Transvaal*: Zoutpansberg, Entabeni, Jan. 1954, H. K. Munro (NCIP). Paratypes: same locality data as holotype (2 ♂ 3 ♀ 3 puparia NCIP). Additional specimen: *Cape Province*: Du Toits Kloof, 5.i.1972, South African Exp. B.M. 1972-1 (1 ♂ BMNH). This specimen has a somewhat different wing pattern than that of the specimens from Entabeni and therefore is not included as a paratype.

Biology and host plants: Three typical puparia together with associated adults were examined from Entabeni. Unfortunately, no data about the host plant were given.

Etymology: A genitive patronym to honour Dr H. K. Munro, who collected the type series.

***Cryptophorellia vumbaensis* sp. n.**

(Figs 9, 21, 35–36)

Diagnosis: Small to medium sized species, with slightly sexually dimorphic wing pattern; 'M' practically uninterrupted and distinct in ♀, interrupted and distinct in ♂.

Description: As in generic description, but with following details.

Wing length: 2,9–3,9 mm.

Colour: Dark, with pleura sometimes partly yellow, and yellow hind margins of terga slightly to moderately well developed; variation generally slight, but pleura and terga of 1 ♂ almost entirely yellow (this specimen may be teneral, however).

Legs: ♂ Midleg of appressed-bristles type.

Wing: ♀ (Fig. 35): Base of wing yellowish; 'M' black and nearly complete, interrupted only at end of cell c; preapical hyaline triangle distinctly wider than other hyaline triangles; this and discal hyaline triangle with rather distinct greyish triangles; area around crossvein r-m yellowish; connection of preapical and apical bands usually wide, reaching vein R_{4+5} ; apical band penetrates slightly into cell m.

Wing ratio: 2,56. ♂ (Fig. 36): as in ♀, but pattern in basal half of wing often lighter and more interrupted; gap between anterior ends of sub-basal and discal bands wider, including basal half of pterostigma; discal band sometimes interrupted centrally, especially around crossvein r-m. Wing ratio: 2,72.

Terminalia: ♂ (Fig. 9): Epandrium as in *C. peringueyi* but less convex posteriorly. ♀: Tergal-oviscapal measure 1,5–2,0; aculeus (Fig. 21): 'neck' rather wide, not clearly differentiated, 'shoulders' weakly developed; 'canal' distinctly wider than margin; apex pointed.

Material examined: Holotype ♂, ZIMBABWE: N. Vumba (S. Rhodesia), 15.viii.1962, D. Cookson, (NMSA). Paratypes: N. Vumba (S. Rhodesia), 10.viii.1964 (2 ♂), 12.viii.1964 (1 ♂), 13.viii.1964 (1 ♀), 2.ix.1965 (1 ♀), all collected by D. Cookson (NMSA); Vumba Mt., viii.1962, Games & Sousa (2 ♂ 2 ♀ NMSA). MALAWI: Zomba Plateau, Mandala Falls, 22.x.1983, A. Freidberg (1 ♂ 2 ♀ TAU).

Etymology: Named after type locality.

***Cryptophorellia zombaensis* sp. n.**

(Figs 22, 37–38)

Diagnosis: Medium-sized species, with moderate sexual dimorphism in wing pattern; 'M' interrupted, but rather distinct in both sexes, with preapical and apical bands united and preapical hyaline triangle very wide.

Description: As in generic description, but with following details.

Wing length: 3,9–4,6 mm.

Colour: Dark, with slight variation; anepisternum sometimes considerably yellow; yellow hind margins of terga slightly to moderately well developed; microtomentum on terga, especially medially, rather distinct.

Legs: ♂ Midleg of appressed-bristles type.

Wing: ♀ (Fig. 37): Base of wing yellowish; bands narrow; 'M' distinctly asymmetrical and interrupted; preapical hyaline triangle 1,5 times wider than both other triangles combined, measured along vein M; sub-basal and discal bands predominantly yellow, with blackish parts as follows: posterior part of sub-basal band behind vein CuA₁, anterior and posterior of bifurcation of R₂₊₃ and R₄₊₅, at and slightly posterior of apex of pterostigma and sometimes small spot near middle of cell dm, marking posterior end of discal band; this and preapical band disconnected at vein CuA₁; preapical band predominantly blackish, very oblique, reaching cell r₁ well before its apex, but uniting with blackish apical band through yellow apex of cell r₁; apical band usually does not cross vein m; 'streak' greyish yellow. Wing ratio: 2,65. ♂ (Fig. 38): Similar to ♀, but pattern markedly lighter, with 'M' predominantly yellowish; blackish parts of sub-basal band as in ♀, but less conspicuous; discal band with small blackish area around apex of pterostigma; preapical band blackish only in posterior half (over crossvein dm-cu and in cell cua₁); discal and preapical bands connected; apical band similar to ♀. Wing ratio: 2,61.

Terminalia: ♂: Epandrium as in *C. peringueyi* but less convex posteriorly. ♀: Tergal-oviscapal measure 1,7–2,3; aculeus (Fig. 22): ‘neck’ wide and tapers gradually; ‘shoulders’ weakly developed; ‘canal’ wide, at narrowest place about as wide as margin; apex slightly notched.

Material examined: Holotype ♂, MALAWI: Zomba Plateau, Emperor’s View, 22–23.x.1983, A. Freidberg (TAU). Paratypes: same collecting data as holotype (1 ♂ 4 ♀ TAU); Zomba Plateau, Chiradzulu Forest, 22–23.x.1983, A. Freidberg (1 ♀ TAU); Zomba Plateau, Mandala Falls, 22.x.1983, A. Freidberg (1 ♀ TAU). Additional specimens: KENYA: 20 km S. Njoro, 28.viii.1983, A. Freidberg (1 ♂ TAU); Naivasha, 14–17.i.1972, A. Freidberg (1 ♂ TAU).

Biology and host plants: The specimens from Zomba Plateau were swept from *Crassocephalum manii* (Hook. f.) Milne-Redh. or a similar looking plant. A larva that escaped from flowerheads of this plant, collected in Kenya, may be this species. The larva pupariated, but unfortunately a braconid emerged.

Etymology: Named after type locality.

Equatorial African Species

***Cryptophorellia flava* sp. n.**

(Figs 10, 17, 23, 39–40, 59)

Diagnosis: Medium-sized species with predominantly yellow body, and moderately developed sexual dimorphism in wing pattern; ‘M’ interrupted but distinct in ♀, slightly modified and less distinct in ♂; apical band isolated in ♀, connected to preapical band over vein R_{4+5} in ♂; cell dm with 2 distinct hyaline areas.

Description: As in generic description, but with following details.

Wing length: 3,8–4,5 mm.

Colour: Predominantly yellow and little variable; spots around bases of major thoracic bristles, area along border of scutellum, subscutellum and mediotergite darker, usually blackish; terga with large to small lateral spots, usually brownish and obscured by microtomentum.

Legs: ♂ Midleg of erect-bristles type.

Wing: ♀ (Fig. 39): Base of wing greyish; ‘M’ as in *C. peringueyi*, although more brownish and yellowish; with discal band interrupted at same places; apical band more extensive, touching or almost touching preapical band, and usually extending slightly more into cell m; preapical band without a ‘tooth’; hyaline triangles almost entirely covered by white microtrichia. Wing ratio: 2,44. ♂ (Fig. 40): Similar to *C. longicauda*, but pattern yellow and brownish yellow with ‘M’ more distinct; hyaline triangles rather distinct, discal and median triangles clearly traversing through cell dm. Wing ratio: 2,59.

Terminalia: ♂ (Fig. 10): Posterior surface of epandrium straight centrally, slightly convex below; epandrium ventrally rather widely rounded. ♀: Tergal-oviscapal measure 2,3–2,5; aculeus (Fig. 23): tapers strongly toward ‘neck’, which is rather

short; 'shoulders' rather prominent; 'canal' about 1,5–2,0 times as wide as margin; apex rather deeply notched; spermatheca as in Fig. 17.

Material examined: Holotype ♂, KENYA: 8 km NE Kericho, 18.xi.1986, ex. flowerhead *Crassocephalum vitellinum*, 8.xii.1986, A. Freidberg (TAU). Paratypes: KENYA: Kakamega Forest, 20–21.xi.1986, A. Freidberg (1 ♂ TAU); Chepsonoi, E. Kakamega, 8–9.xi.1983, A. Freidberg & I. Yarom (1 ♂ 2 ♀ TAU); Kericho, 16.xi.1986, A. Freidberg (1 ♀ TAU); Kericho, 6 500 feet, 17.xii.1970, A. E. Stubbs (1 ♀ BMNH); 8 km NE Kericho, 18.xi.1986, A. Freidberg (1 ♀ TAU); 15 km NE Kericho (forest), 18.xi.1986, A. Freidberg (1 ♀ TAU); 25 km NE Kericho, 17.xi.1986, A. Freidberg (1 ♂ 2 ♀ TAU); Naivasha, vii.1937, H. J. A. Turner (1 ♀ NMB); 14–17.i.1972, A. Freidberg (1 ♂ 7 ♀ TAU); Karura, vi.1936, van Someren (1 ♂ BMNH); Muguga, x.1969, C. F. Dewhurst (1 ♂ BMNH). UGANDA: Kigezi Dist., Kanaba, 7 800 ft, xi.1934, F. W. Edwards (1 ♀ BMNH).

Biology and host plants: Larvae were found, usually singly, in flowerheads of *Crassocephalum vitellinum* (Benth.) S. Moore. Many larvae escaped from collected flowerheads and pupariated. However, only 1 ♂ and 3 braconids emerged, the rest died. Characters of the larva are illustrated in Fig. 59.

Etymology: Derived from predominantly yellow (= *flavus*, Latin) coloration.

***Cryptophorellia longicauda* sp. n.**

(Figs 11, 24, 41–42)

Diagnosis: Similar to *C. flava*, differing in darker body coloration, more elongate oviscape and aculeus and in more uniformly yellow cell dm of ♂ wing, which lack distinct hyaline areas.

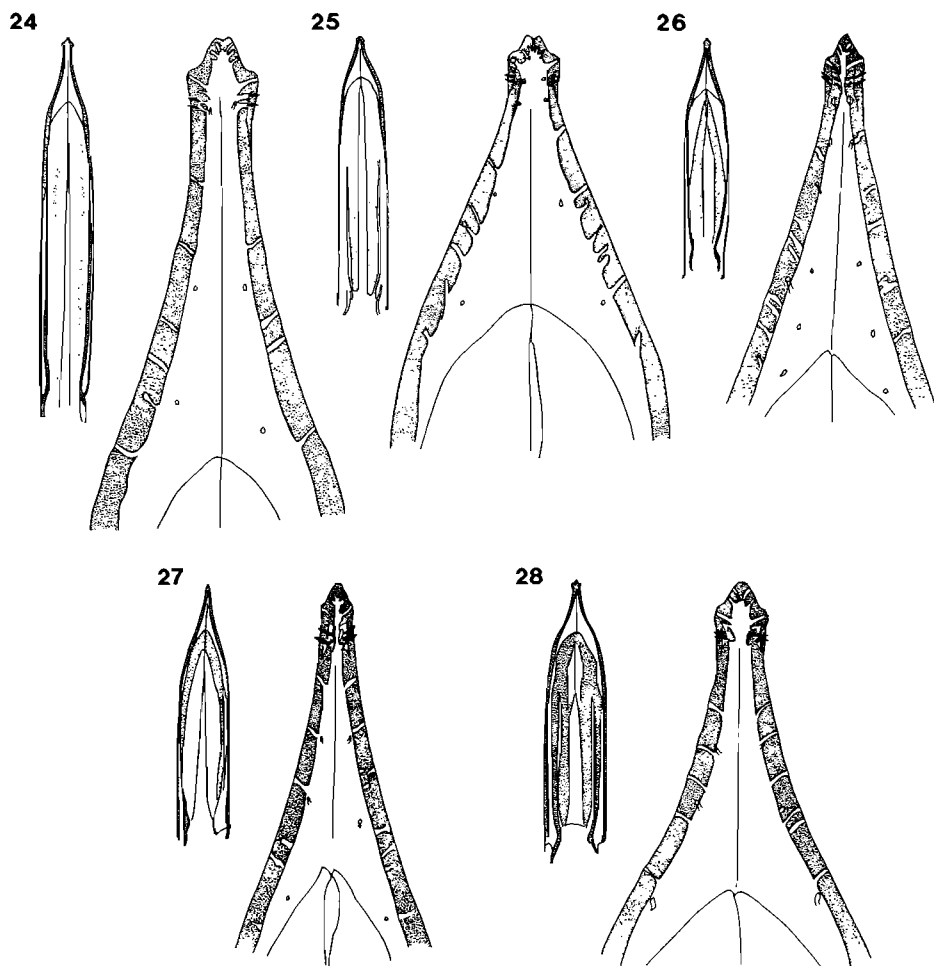
Description: As in generic description, but with following details.

Wing length: 3,3–4,8 mm.

Colour: Rather pale; microtomentum relatively heavy; dorsal postcranium (occiput) extensively blackish; scutum, subscutellum, mediotergite and often anepimeron dark; pleura otherwise entirely or almost entirely yellow; dark areas of terga usually reduced, brownish, forming lateral spots, generally larger and darker in ♀; in darker ♀ specimens only narrow yellow hind margins and median markings of microtomentum observable on terga.

Legs: ♂ Midleg of erect-bristles type.

Wing: ♀ (Fig. 41): Similar to ♀ of *C. flava* but dark bands contain less yellow. Wing ratio: 2,48. ♂ (Fig. 42): Wing almost uniformly golden yellow, with 'M' rather obscure; sub-basal band somewhat darker than other bands; cell dm appears uniformly or almost uniformly yellow, at most with 2 slightly paler areas, one basally and one apically; representing discal and median hyaline triangles, respectively, which are hardly discernible (when viewed under stereoscope) and do not appear to traverse this cell; only true hyaline spots are 1 in apical part of cell br, smaller 1 at basal part of cell r_{4+5} and, occasionally, a small spot in cell r_{2+3} , immediately anterior of latter spot; preapical triangle also hardly discernible. Wing ratio: 2,65.



Figs 24–28. *Cryptophorellia* spp., aculeus (whole and apex). 24. *C. longicauda* sp. n. 25. *C. montana* sp. n. 26. *C. minuta* sp. n. 27. *C. prairiensis* sp. n. 28. *C. stenoptera* sp. n.

Terminalia: ♂ (Fig. 11): Epandrium as in *flava* but wider dorsally and more pointed ventrally. ♀: Tergal-oviscapal measure 3,0–3,5; aculeus (Fig. 24): ‘neck’ rather narrow and attenuate, widens almost symmetrically proximally and distally; ‘shoulders’ very prominent; ‘canal’ about twice as wide as margin; apex rather deeply notched.

Material examined: Holotype ♂, KENYA: Chepsonoi, E, Kakamega, 8–9.xi.1983, A. Freidberg (TAU). Paratypes: Same locality data as holotype, A. Freidberg & I. Yarom (1 ♂ 4 ♀ TAU); Kakamega Forest, 20–21.xi.1983, A. Freidberg (2 ♂ TAU); Kericho, 10.xi.1983, A. Freidberg (6 ♂ TAU NMSA); Kericho, 6 500 ft, 17.xii.1970, A. E. Stubbs (2 ♂ BMNH); 8 km NE Kericho, 18.xi.1986, A. Freidberg (2 ♀ TAU); 25 km NE Kericho, 17.xi.1986, A. Freidberg & I. Susman (4 ♂ 1 ♀ TAU); Naivasha, 14–17.i.1972, A. Freidberg (5 ♂ 3 ♀ TAU NMSA);

viii.1937, van Someren, Bred ex Comp[osite] 179 (1 ♀ NMB); vii.1937, H. J. A. Turner (1 ♂ NMB); Lake Naivasha, 6 181 feet, 14.xii.1970, A. E. Stubbs (1 ♀ BMNH); Uplands, ix.1937, van S[omeren], Bred ex Comp[osite] 288 (2 ♀ USNM); Nairobi, vii.1937, van Someren (1 ♀ BMNH); Meru 5–7000 feet, 24–29.xii.1970, A. E. Stubbs (1 ♂ 1 ♀ BMNH). UGANDA: Ruwenzori Range, Namwamba Valley, 6 500 ft, xii.1934–i.1935, F. W. Edwards (1 ♂ 1 ♀ BMNH); Ruwenzori Range, Kilembe, 4 500 ft, xii.1934–i.1935, F. W. Edwards (1 ♂ 1 ♀ BMNH); Impenetrable Forest, SW Uganda, 27.i.1972, A. Freidberg (2 ♂ 1 ♀ TAU); Kabale, 27.i.1972, A. Freidberg (1 ♀ TAU). CAMEROUN: Mt. Cameroon (1000–1800 m), 11–13.xi.1987, F. Kaplan (1 ♂ TAU). NIGERIA: Mambilla Plateau, Ngel Nyaki, 28.xi–3.xii.1968, J. C. Deeming (1 ♂ BMNH).

Etymology: Name derived from length of oviscap (in Latin *longus* = long, *cauda* = tail), which is the largest known in the genus.

***Cryptophorellia montana* sp. n.**

(Figs 2, 25, 43–44)

Diagnosis: Similar to *C. flava* and *C. longicauda*, differing in darker body and wing pattern coloration, and in shorter oviscap and aculeus.

Description: As in generic description, but with following details.

Wing length: 4,0–5,0 mm.

Colour: Dark, slightly variable; anepisternum considerably or entirely yellow, other pleura blackish, terga predominantly blackish, with distinct paler posterior margins and median markings of microtomentum which are generally better developed in ♂.

Legs: ♂ Midleg of erect-bristles type (Fig. 2).

Wing: ♀ (Fig. 43): Base of wing grey; 'M' blackish but interrupted; pterostigma usually blackish although lighter basally; more or less distinct interruption present between sub-basal and discal bands in cell c and distinct narrow interruption between preapical and apical bands, although area around end of vein R_{2+3} sometimes yellow; discal band interrupted around crossvein r-m and in cell dm; hyaline triangles with indistinct and irregular grey areas. Wing ratio: 2,54. ♂ (Fig. 44): 'M' unevenly brownish and yellowish, somewhat obscure against a greyish background; preapical and apical bands widely connected, although connection usually interrupted by subhyaline spot at or near end of vein R_{2+3} ; apical band extends proximad along distal half of ultimate section of vein M; discal cell usually traversed by discal and median hyaline triangles although discal triangle is somewhat interrupted by yellow area over vein CuA_1 which is occasionally more distinct and connects sub-basal and discal bands. Wing ratio: 2,59.

Terminalia: ♂: Epandrium as in *C. peringueyi*, but less convex posteriorly. ♀: Tergal-oviscapal measure 2,0–2,3; aculeus (Fig. 25): tapers strongly toward 'neck' which is short and wide; 'shoulders' very prominent; 'canal' about twice as wide as margin; apex deeply notched.

Material examined: Holotype ♂, KENYA: Uplands, 15.xi.1986, A. Freidberg (TAU). Paratypes: same collecting data as holotype, A. Freidberg & I. Susman

(31 ♂ 33 ♀ TAU BMNH NMSA USNM); Equator, 30.xi.1983, I. Yarom (1 ♀ TAU); Kericho, 10.xi.1983, I. Yarom (1 ♀ TAU); 30 km NE Kericho, 10.xi.1983, A. Freidberg (1 ♂ TAU).

Biology and host plants: At Uplands the specimens were swept from *Crassocephalum montuosum* (S. Moore) Milne-Redh. The next day flowerheads of this plant yielded larvae which pupariated. Of 15 puparia 8 yielded braconids, and the remaining 7 apparently died.

Etymology: Derived from mountainous habitat of species, and also from the name of a plant which apparently is its host.

***Cryptophorellia tarsata* sp. n.**

(Fig. 45)

Diagnosis (diagnosis and description based on ♂ holotype only): A large species; hind metatarsus with comb of long straight whitish bristles; 'M' wing pattern rather obscure.

Description: As in generic description, but with following details.

Wing length: 6,0 mm.

Colour: Rather dark, with conspicuous yellow notopleural area; terga with distinct yellow posterior and lateral margins and distinct yellow or microtomentose median markings.

Legs: Midleg of erect-bristles type; hind metatarsus with setal ornamentation similar to *C. peringueyi*, but white bristles straight, not curved, and comb not extending to tarsomere 2.

Wing (Fig. 45): Similar to *C. montana* but 'M' lighter and more obscure; of 3 hyaline triangles only 2 hyaline spots remain, in cells br and r_{4+5} symmetrically on both sides of crossvein r-m; other triangles greyish or yellowish, rather obscure. Wing ratio: 2,56.

Terminalia: Not studied.

Material examined: Holotype ♂, UGANDA: Ruwenzori Range, Balirungi River, 11 200 ft, 1.viii.1952, D. S. Fletcher (BMNH)/'Ruwenzori Exped. B. M. 1952-566'.

Paratype: 1 ♂, damaged, same locality data as Holotype (BMNH).

Etymology: Derived from the unusual setal ornamentation on hind tarsus.

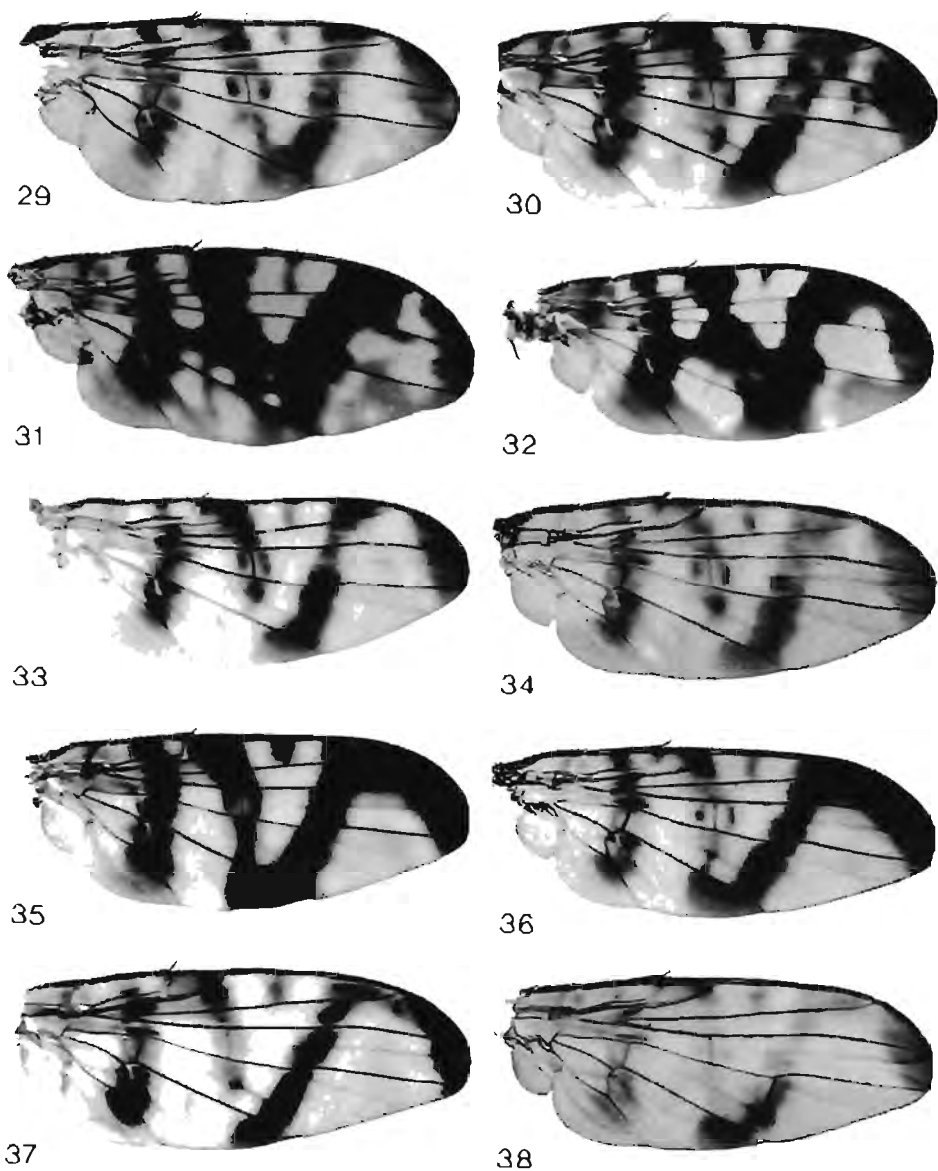
***Cryptophorellia trivittata* sp. n.**

(Fig. 46)

Diagnosis (diagnosis and description based only on ♂ holotype, unless otherwise specified): A medium-sized, completely yellow species, with 3 dark, practically isolated bands on wing (sub-basal, preapical, apical).

Description: As in generic description, but with following details.

Wing length: 3,6 mm.



Figs 29–38. *Cryptophorellia* spp., wing. 29. *C. peringueyi* (Bezzi), ♀. 30. *C. peringueyi* (Bezzi), ♂. 31. *C. phaeoptera* (Bezzi), ♀. 32. *C. phaeoptera* (Bezzi), ♂. 33. *C. munroi* sp. n., ♀. 34. *C. munroi* sp. n., ♂. 35. *C. vumbaensis* sp. n., ♀. 36. *C. vumbaensis* sp. n., ♂. 37. *C. zombaensis* sp. n., ♀. 38. *C. zombaensis* sp. n., ♂.

Colour: Almost entirely yellow, with V-marking on occiput barely distinct; microtomentum very fine, silvery, indistinct on terga; setulae on scutum and terga brownish, with a yellowish sheen. 2 ♀ from Senanga almost entirely yellow, like ♂, but with 'shades' of lateral spots on terga mainly due to slightly darker hairs, and with tip of oviscape black. ♀ from Cholo similar to one from Senanga, but slightly brownish around bases of major thoracic bristles, at base of scutellum, on subscutellum and mediotergite, and with oviscape entirely black.

Legs: Midleg of erect-bristles type.

Wing (Fig. 46): Basal, preapical and apical bands blackish and complete; discal band reduced to yellowish stained area containing few darker spots; all bands isolated except sub-basal and discal which are connected by a yellow area; pterostigma almost entirely yellow, only apex black; gap between preapical and apical bands wide; discal and preapical hyaline triangles with indistinct grey triangles. Wing ratio: 2,43.

Terminalia: Not studied.

Material examined: Holotype ♂, KENYA: Kipkelion, 17.xi.1986, A. Freidberg (TAU). Additional specimens: ZAMBIA: Senanga, North Vlei, 31.vii.1952, H. K. Munro (Carp exp.) (2 ♀ 2 puparia NCIP). MALAWI: Cholo, (no date), R. C. Wood (1 ♀ BMNH). ♀ specimens not included as paratypes as there is no way to ascertain their conspecificity with the ♂.

Etymology: Derived from 3 dark transverse bands on wing (Latin *tri* = three, *vittatus* = striped).

Cryptophorellia unnamed species

(Fig. 47)

This species is not named here because only one, rather damaged, male is available for study. The general wing pattern and coloration and midleg chaetotaxy indicates its relationships with other East African species. The dark scutum, largely yellow pleura and brownish lateral spots on terga puts it close to *C. longicauda*, to which species it may eventually be assigned. It differs from *C. longicauda* in having a relatively well-defined wing pattern (Fig. 47), including a clear-cut hyaline spot apically at cell dm, and in lacking hyaline area basally at cell dm. Wing length: 3,6 mm.

Material examined: TANZANIA: Amani, xi.35 N. L. H. Krauss (1 ♂ USNM).

Madagascar Species

Cryptophorellia elongatula sp. n.

(Figs 1, 12, 48)

Diagnosis (diagnosis and description based on ♂ only): Large species, with elongate wing and yellow longitudinal bands including band over basal part of ultimate section of vein M.

Description: As in generic description, but with following details.

Wing length: 5,0–5,4 mm.

Colour: Dark, with a rather strong brownish tinge, partly due to heavy brown microtomentum on thorax and abdomen; anepisternum predominantly yellow; blackish areas on terga large, appear as lateral spots because of conspicuous microtomentum medially; yellow hind and lateral margins of terga distinct.

Head (Fig. 1): Of normal shape.

Legs: Midleg of appressed-bristles type.

Wing (Fig. 48): Greatly elongate, pattern mostly in form of longitudinal bands, yellow; wide costal band from base of wing to apex as far posteriorly as middle of cell r_{4+5} (but reaching vein M at wing apex); this band contains a small hyaline spot in cell r_1 immediately beyond pterostigma, and 1–2 additional spots more apicad in cell r_{2+3} ; complete longitudinal band present over cells bm and cup and vein CuA_1 to hind margin; this band connected to costal band at base of wing and sometimes narrowly over crossvein r-m; in addition, transverse band present over crossvein dm-cu; this band connects yellow area over crossvein r-m through narrow longitudinal band over vein M which usually extends about half way along ultimate section of vein M, in 1 specimen—to wing apex; cell br distally with elongate hyaline spot; cell dm with elongate hyaline spot in proximal half and shorter hyaline spot distally (these two sometimes fused). Wing ratio: 2,75.

Terminalia (Fig. 12): Epandrium posteriorly slightly concave centrally, strongly convex below, very widely rounded ventrally.

Material examined: Holotype ♂, MADAGASCAR: Madagascar Centre, Plateau Soaindrana 2 060 m; Andringitra–Ambalavao, 14–17.i.1958, B. Stuckenberg (NMSA). Paratypes: Madagascar Centre, Vakoana 1 520 m, Andringitra–Ambalavao, 21–24.i.1958, B. Stuckenberg (1 ♂ NMSA); Andohahelo [=Andohahela], 1 800 m, R. P[aulian] (1 ♂ MNHP); Ankaratra Massif, Tsiafajavona Peak, i.1956, B. Stuckenberg (1 ♂ NMSA). Additional specimen: Plateau Soaindrana, 2 060 m, Andringitra–Ambalavao, 14–17.i.1958, B. Stuckenberg (1 ♀ NMSA). The ♀ is not included as a paratype as it is doubtfully referred to this species. It resembles that of *C. stenoptera* but is larger (wing length 5,2 mm) and the apical wing band does not extend beyond vein M, ending abruptly at that vein. Etymology: Derived from elongate shape of wing of ♂.

Cryptophorellia madagascariensis sp. n.

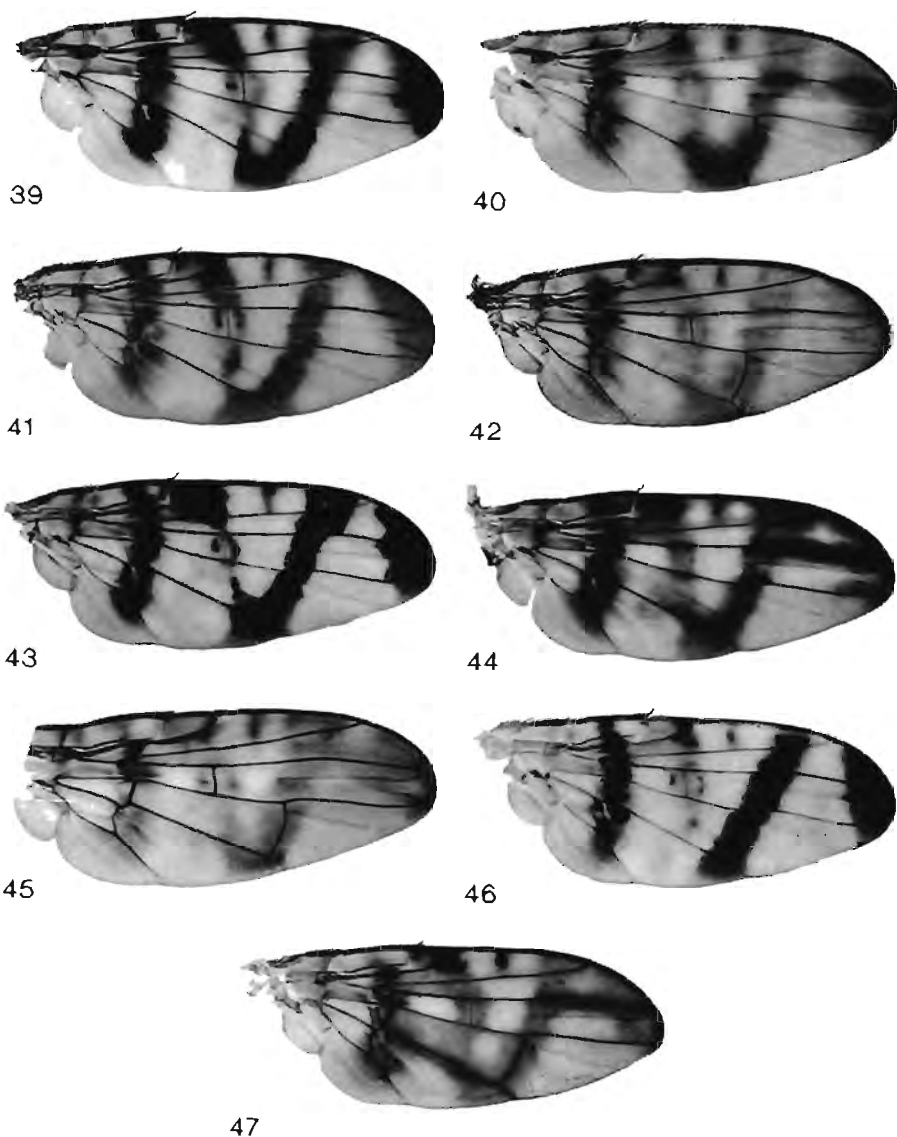
(Fig. 49)

Diagnosis (diagnosis and description based on ♂ only): Medium-sized species, with distinct brownish yellow 'M' on wing, yellow basal part of wing and wide connection between apical and preapical bands, also over vein R_{4+5} .

Description: As in generic description, but with following details.

Wing length: 3,8 mm.

Colour: Dark, including brown microtomentum on scutum, especially on post-sutural area, blackish pleura, except yellow notopleural area, and blackish terga, with only narrow pale hind margins and weakly developed median markings.



Figs 39-47. *Cryptophorellia* spp., wing. 39. *C. flava* sp. n., ♀. 40. *C. flava* sp. n., ♂. 41. *C. longicauda* sp. n., ♀. 42. *C. longicauda* sp. n., ♂. 43. *C. montana* sp. n., ♀. 44. *C. montana* sp. n., ♂. 45. *C. tarsata* sp. n., ♂. 46. *C. trivittata* sp. n., ♂. 47. *C.* sp., ♂.

Legs: Midleg of appressed-bristles type.

Wing (Fig. 49): Wing shape and pattern, including a rather distinct 'M', generally similar to females of other species from Madagascar, possibly indicating at most slight sexual dimorphism in this species. Unlike these females, pattern mostly yellow, less clear-cut, and streak in cell r_1 united with preapical band; preapical band broadly united with apical band, connection extends almost to middle of cell r_{4+5} ; apical band practically not extending into cell m; the wing base, including cells bm and cup, also brownish-yellow. Wing ratio: 2,63.

Terminalia: Not studied.

Material examined: Holotype ♂, MADAGASCAR: Ankaratra Massif, Tsiafajavona Peak, Jan. 1956, B. Stuckenberg (NMSA) (wing dissected and mounted on separate slide). Paratype: Ambatofitorahana, km-303, Rte de Mananjary (1 ♂ MNHP).

Etymology: Derived from country where species was found.

***Cryptophorellia minuta* sp. n.**

(Figs 6, 13, 15, 26, 50–51)

Diagnosis: A small, strongly sexually dimorphic species; ♂ with elongate wing and yellow longitudinal bands, lacking band over ultimate section of vein M; ♀ with apex of aculeus narrow, with 'canal' much narrower than margins.

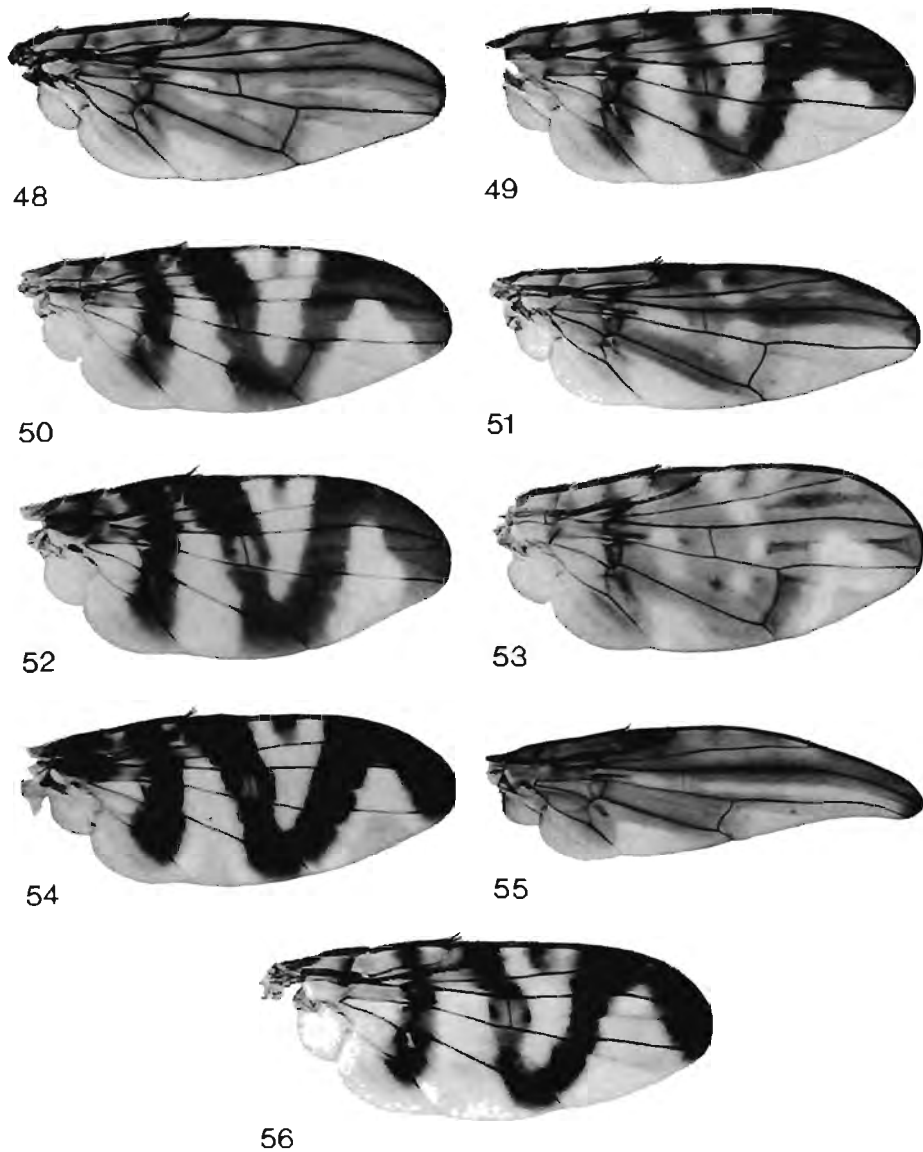
Description: As in generic description, but with following details.

Wing length: 3,1–4,4 mm.

Colour: A dark species, coloration similar to *elongatula*, but anepisternum predominantly blackish, and terga appear banded, not with lateral spots, due to lack of conspicuous microtomentum medially; ♀ generally darker than ♂.

Legs: ♂ Midleg of appressed-bristles type.

Wing: ♀ (Fig. 50): base of wing blackish; 'M' very dark and uninterrupted; sub-basal band not reaching hind margin of wing; preapical and apical bands broadly united; apical band extends slightly into cell m; preapical hyaline triangle rather wide and without distinct grey triangle. Wing ratio: 2,61. ♂ (Fig. 51): wing greatly elongate, and wing pattern mostly in form of yellow, longitudinal bands; wide costal band, occupying almost half of wing surface, extending from base of wing to apex, and as far posteriorly as middle of cell r_{4+5} (but at wing apex reaches vein M by a grey spot), interrupted by series of small hyaline or subhyaline spots, one in cell r_1 between pterostigma and 'streak', and 2–3 in distal part of cell r_{2+3} ; complete longitudinal band present over cells bm and cup and vein CuA_1 to hind margin; this band is connected to costal band by 3 connections: broadly at base of wing, by a transverse band across middle of cell dm and over crossvein r-m, and narrowly to a transverse band over crossvein dm-cu, leaving an oval longitudinal hyaline spot in cell br extending slightly into cell dm, and a transversal hyaline spot in cells r_{4+5} and dm, between crossveins; 'streak' recognisable as dark spot within costal band. Wing ratio: 3,00.



Figs 48–56. *Cryptophorellia* spp., wing. 48. *C. elongatula* sp. n., ♂. 49. *C. madagascariensis* sp. n., ♂. 50. *C. minuta* sp. n., ♀. 51. *C. minuta* sp. n., ♂. 52. *C. prairiensis* sp. n., ♀. 53. *C. prairiensis* sp. n., ♂. 54. *C. stenoptera* sp. n., ♀. 55. *C. stenoptera* sp. n., ♂. 56. *C. stuckenbergi* sp. n., ♂.

Terminalia: ♂ Epandrium (Fig. 13) posteriorly slightly concave centrally, distinctly convex below; posterior view as in Fig. 6; distiphallus as in Fig. 15. ♀ Tergal-oviscapal measure 1,5–2,0; aculeus (Fig. 26): 'neck' very narrow; 'shoulders' moderately prominent; 'canal' extremely narrow, almost interrupted; apex pointed.

Material examined: Holotype ♂, MADAGASCAR: Madagascar Centre, Plateau Soaindrana 2 060 m, Andringitra–Ambalavao, 14–17.i.1958, B. Stuckenberg (NMSA). Paratypes: Same locality data as holotype (12 ♂ 18 ♀ NMSA TAU); Vakoana, 1 520 m, Andringitra–Ambalavao, 21–24.i.1958, B Stuckenberg (1 ♂ NMSA).

Etymology: Derived from small size of species.

***Cryptophorellia prairiensis* sp. n.**

(Figs 3, 27, 52–53)

Diagnosis: Medium to large-sized species, with moderately developed sexual dimorphism in wing pattern; both sexes with wide wings; ♂ with curved row of small hyaline spots from cell r_1 to apex of cell dm, and with a complete yellow band over vein CuA_1 ; female with hyaline triangles of wing narrow and sub-basal band reaching hind margin.

Description: As in generic description, but with following details.

Wing length: 3,2–4,8 mm.

Colour: Rather variable; ♀ dark; ♂ rather pale; ♀ pleura predominantly blackish, but anepisternum often mostly yellow; ♂ pleura predominantly or entirely yellow; Plateau Soaindrana ♂ scutum also predominantly yellow; ♀ terga predominantly blackish, with distinct pale hind margins and median markings of microtomentum; dark areas occasionally appearing as large lateral spots; ♂ terga usually predominantly yellow, with dark areas appearing as small to medium-sized lateral spots; 1 ♂ terga as in ♀.

Legs: ♂ Midleg of appressed-bristles type (Fig. 3).

Wing: ♀ (Fig. 52): Base of wing blackish; 'M' very dark and coherent; bands wide relative to hyaline triangles; sub-basal band reaches hind margin of wing; area immediately around crossvein r-m paler; preapical and apical bands broadly united; apical band extends deeply into cell m. Wing ratio: 2,38. ♂ (Fig. 53): Pattern a modified 'M', almost uniformly yellow, without blackish spots; bands wide; complete yellow band over vein CuA_1 ; 'streak' (in cell r_1) almost indiscernible from preapical band; median hyaline triangle modified into narrow band or curved line of 4, rounded, hyaline spots (1 each in cells r_1 , r_{2+3} , r_{4+5} and dm); an additional, oval, hyaline spot extends from apical half of cell br to basal half of cell dm; preapical and apical bands broadly united; preapical hyaline triangle contains more or less distinct grey triangle in cell m. Wing ratio: 2,38.

Terminalia: ♂: Epandrium as in *C. minuta*. ♀ (Fig. 27): Tergal-oviscapal measure 1,5–2,0; aculeus (Fig. 27): 'neck' very narrow; 'shoulders' weakly developed; 'canal' extremely narrow; apex indistinctly notched.

Material examined: Holotype ♂. MADAGASCAR: Madagascar Nord, Prairie de lisieres, 840 m, Joffreville, Diego-Suarez, 4.xii.1957, B. Stuckenberg (NMSA). Paratypes: Same collecting data as holotype (5 ♂ 11 ♀ NMSA TAU); Madagascar Est, district Sambava, Marojejy, Ambinanitelo 500 m, xii.1958, [E.] Raharizonina (1 ♀ ?) (This specimen and the following ones with query instead of depository belong either to MNHP or to NCIP, although it is not known in every case to which of the two); Tam., Perinet, 2.x.1958, F. Keiser (1 ♀ NHMB); Tan.; Manjakatampo, 5.i.1958, F. Keiser (4 ♂ NHMB); Andranotobaka, 1 400 m, Ambatolampy, iii.1957, P. Griv[eaud], (1 ♂ ?); Madagascar Centre, dct Ambatolampy. Manjakatampo, 1 700 m, 11–15.xii.1957, B. Stuckenberg (2 ♀ NMSA); Same locality, 2 100 m, xi.1959, A. R[obinson] (1 ♀ ?); La Mandraka, 1 250 m, Manjakandriana, 30.x.1956, A. R[obinson] (2 ♂ ?); Nosivola, R. N. 3 (1 ♀ ?); Ambohitantely, 26.ii.1948, P. G[riveaud] (1 ♀ ?); Additional specimen: Madagascar Centre, Plateau Soaindrana 2 060 m, Andringitra–Ambalavao, 14–17.i.1958, B. Stuckenberg (1 ♂ NMSA). The wing pattern of this specimen is slightly different from that of the others, and therefore it is not included as a paratype.

Etymology: Derived from type of biotope where species was collected.

***Cryptophorellia stenoptera* sp. n.**

(Figs 28, 54–55)

Diagnosis: A medium to large-sized, strongly sexually dimorphic species; ♂ with peculiarly elongate, curved and pointed wing, and with yellow longitudinal bands; ♀ aculeus with 'canal' slightly wider than margins.

Description: As in generic description, but with following details.

Wing length: 6,7 mm (♂), 4,2–4,5 mm (♀).

Colour: Dark, with pleura predominantly yellow in ♂, predominantly blackish, but with anepisternum mostly yellow, in ♀; terga narrowly but distinctly microtomentose at hind margins and medially.

Legs: ♂ Midleg of appressed-bristles type.

Wing: ♀ (Fig. 54): Base of wing black; 'M' very dark and coherent; bands wide; sub-basal band does not reach hind margin; area immediately around crossvein r-m paler; preapical and apical bands broadly united; apical band extends slightly into cell m. Wing ratio: 2,56. ♂ (Fig. 55): Wing extremely elongate, narrowed apically and curved, predominantly golden-yellow; pattern composed of 2 wide longitudinal bands, 1 along entire anterior half of wing, and 1 from basal cells, over cell dm which is entirely yellow, and over anterior margin of cell CuA₁, extending narrowly along basal $\frac{1}{3}$ of ultimate section of vein M; the 2 yellow bands connected over crossvein r-m leaving elongate hyaline spot at apical half of cell br; yellow pattern extends over vein A₁ almost to hind margin; streak entirely embedded in anterior longitudinal band. Stigmal ratio 3; vein M ratio 3,5. Wing ratio: 3,54.

Terminalia: ♂: Not studied. ♀: Tergal-oviscapal measure 1,7; aculeus (Fig. 28): tapers strongly toward rather narrow 'neck'; 'shoulders' prominent; 'canal' at narrowest place slightly wider than margin; apex rounded.

Material examined: Holotype ♂, MADAGASCAR: Madagascar Centre, Andringitra Sud, Andrianony, cirque Manjarivolo, 1 650 m, 26.x.–3.xi.1970, Piegé lumineux [light trap] (MNHP); Paratypes: Same collecting data as holotype (2 ♀ MNHP). Additional specimens: Andohahelo [? Andohahela], i.1954, R. P[aulian] (3 ♀, including 1 ♀ without date, MNHP & NCIP).

Etymology: Derived from the unusually narrow wing of the ♂ (Greek *stenos* = narrow; *pteron* = wing).

***Cryptophorellia stuckenbergi* sp. n.**

(Figs 14, 56)

Diagnosis (diagnosis and description based on ♂ only): A small to medium-sized species, with distinct brownish 'M' on wing, with apical and preapical bands narrowly connected.

Description: As in generic description, but with following details.

Wing length: 4.0–4.2 mm.

Colour: As in *C. madagascariensis*, but median markings of microtomentum, on terga well developed and distinct.

Legs: Midleg of appressed-bristles type.

Wing (Fig. 56): as in *C. madagascariensis*, with following differences: pattern slightly darker, mostly brownish yellow; cells bm and cup almost entirely hyaline; connection of preapical and apical bands not extending beyond vein R_{4+5} ; apical band extending slightly but distinctly into cell m. Wing ratio: 2.50.

Terminalia (Fig. 14): Epandrium slightly undulate posteriorly, rather pointed ventrally.

Material examined: Holotype ♂, MADAGASCAR: Madagascar Centre, Lac Froid, 1 620 m, dct Ambatolampy, 11–15.xii.1957, B. Stuckenberg, (NMSA). Paratypes: Ankaratra Massif, Tsiafajavona Peak, i.1956, B. Stuckenberg (1 ♂ NMSA); Madagascar Centre, Plateau Soaindrana 2060 m, Andringitra–Ambalavao, 14–17.i.1958, B. Stuckenberg (1 ♂ NMSA).

Etymology: A genitive patronym to honour Dr B. R. Stuckenberg, who collected the type series of 5 of the 6 Malagasy species, including this one.

PHYLOGENY AND ZOOGEOGRAPHY

The phylogeny suggested below (Fig. 57) is based on all 17 recorded species, but only 11 are known from both sexes. Six species are known from males only, and some females that were studied were not assigned to males. Additional species undoubtedly still await discovery, both on mainland Africa and Madagascar, and these, when discovered, may be used to test the proposed scheme.

Cryptophorellia is structurally very homogenous, and evidence to support the phylogeny of its species is limited to characters of the wings, legs and, to a lesser extent, the aculeus. As shown below, however, the resulting phylogeny is also supported by the distribution of the species.

In the known females of the equatorial African species (4, including *C. peringueyi* which occurs also in southern Africa), as well as in some of the males (eg. *C. trivittata*), the 'M' pattern of the wing is interrupted, and the apical spot is isolated. In all females and males from Madagascar, including the females that have not been assigned to species, the 'M' pattern is complete, and the apical band is more or less broadly united with the preapical band. In the southern African species there is no uniformity in this regard. In *C. munroi* the apical spot is isolated in both sexes; in *C. phaeoptera* it is variable, although usually isolated in the female and united in the male; in *C. vumbaensis* and *C. zombaensis* it is united in both sexes, although in the male of *C. zombaensis*, because of the light coloration of the pattern, the apical spot may appear isolated.

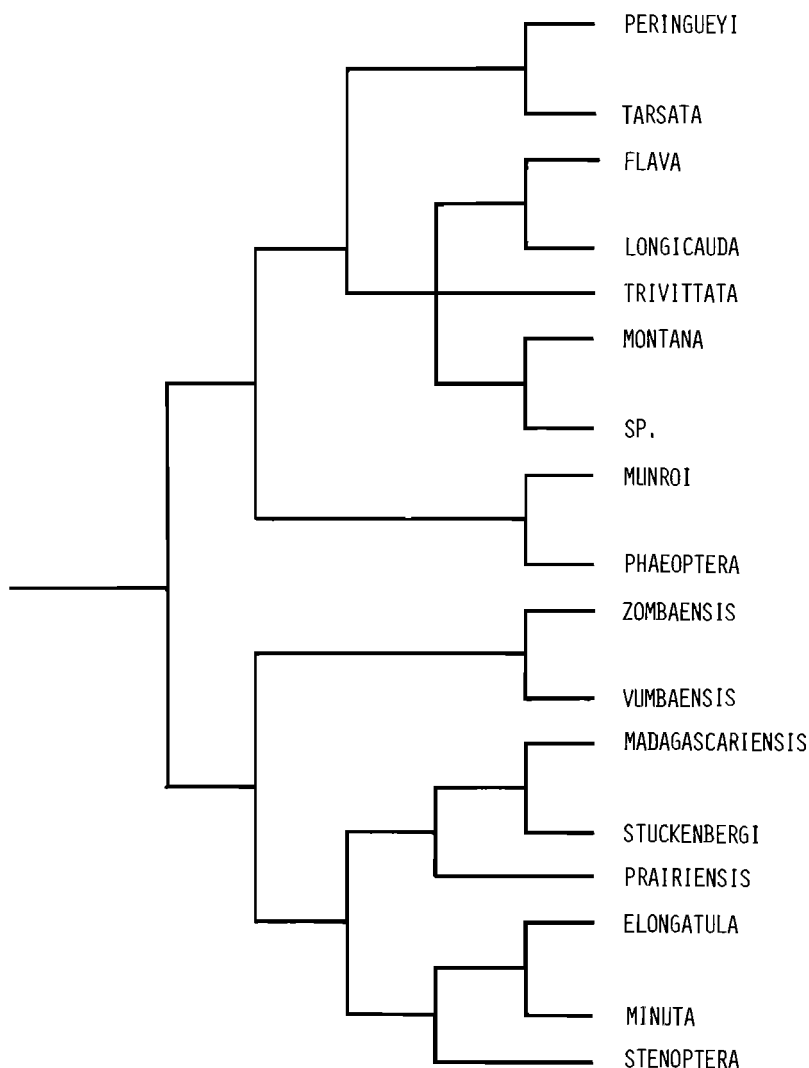


Fig. 57. Hypothetical phylogeny of the species of *Cryptophorellia*.

This evidence suggests that at the time Madagascar became completely isolated from Africa, some 40 million years B.C. (Jolly *et al.*, 1984), only one lineage of *Cryptophorellia* existed. Species of this lineage inhabited both the receding island and that part of mainland Africa immediately opposite the island (Mozambique of today and adjacent areas). The ancestor isolated on the island has evolved into at least six species, all endemic and closely related, as judged by the female sex. The mainland ancestor became very widespread (Fig. 58) and evolved into two main sublineages. The first sublineage, comprising only two species (*C. vumbaensis* and *C. zombaensis*) that are still found in the area where their ancestor originated, had retained the ancestral characters in the female. The second sublineage is characterised by the female having a more broken-up wing pattern with an isolated apical spot. This sublineage has radiated more dramatically, evolving into at least six East African species (one extending as far west as Nigeria), two southern African species, and a very widespread species (*C. peringueyi*).

The above phylogeny is essentially corroborated by another character, namely, the Chaetotaxy of the male midleg. In all East African species (with the exception of *C. zombaensis*) the midleg of the male is of the erect-bristles type, whereas in all Malagasy species the midleg of the male is of the appressed-bristles type.

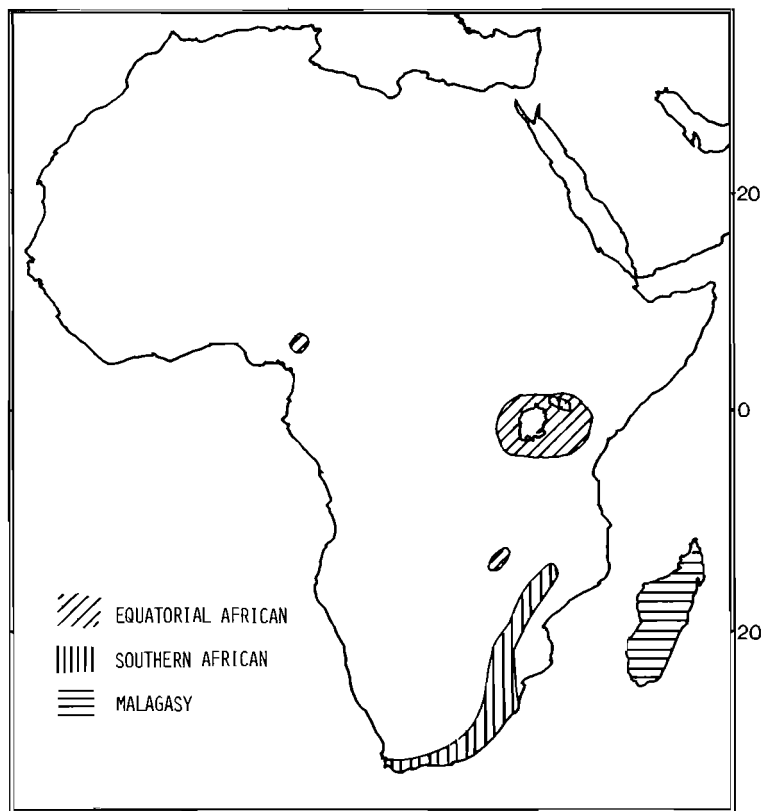


Fig. 58. Broad distribution of the three main geographical groups of *Cryptophorellia*.

C. vumbaensis and *C. zombaensis*, which are closer to the Malagasy species in the wing pattern, also resemble them in the midleg's characters. The strictly South African species, *C. phaeoptera* and *C. munroi*, show an intermediate position in the leg's characters, since most bristles on the anterior aspect of the midfemur and midtibia are only semi-erect.

The remaining phylogeny is based on minor assumed synapomorphies. Two species, *C. peringueyi* and *C. tarsata*, share the unique character of long, whitish, ventral bristles on the male's hind metatarsus. Two other species, *C. flava* and *C. longicauda*, are extremely similar in both sexes, having the longest oviscapae of the genus and may even share a common host plant. An undescribed species and *C. montana* share an extremely similar wing pattern in the male. In the species from Madagascar the phylogeny is based on characters of the male wing. *C. stuckenbergi* and *C. madagascariensis* have a distinct 'M' pattern and probably exhibit only slight sexual dimorphism in the wing. *Cryptophorellia prairiensis*, with its broad wing and reticulate-banded pattern, is isolated. In *C. elongatula*, *C. minuta* and *C. stenoptera* the wing is unusually elongate and the pattern is similarly unusual. The peculiar wing shape of *C. stenoptera* probably represents the most derived situation (Fig. 57).

BIOLOGY AND IMMATURE STAGES

Very little is known about the biology of *Cryptophorellia* species (Munro 1925 1935 1960) and practically nothing about their immature stages. An interesting feature, observed by Munro (1935) in *C. peringueyi*, and by us in other species, which is probably characteristic of the genus, is the habit of mature larvae of leaving the flowerheads of their host plants to pupariate in the soil. In addition to *C. peringueyi*, this phenomenon was observed by us in *C. flava*, and other associations of collected adults with puparia, although lacking the final proof, also indicate its occurrence in *C. montana*, *C. munroi* and *C. phaeoptera*. Leaving the host plant for pupariation is nearly universal in dacine and trypetine Tephritidae, most of which are frugivorous. Conversely, in the Tephritinae and other groups that infest Asteraceae, pupariation in the plant is the general rule to which there are very few known exceptions (eg. in *Elgonina* Munro, unpublished observation by A. Freidberg). Within the *Sphenella* group of genera to which *Cryptophorellia* belongs (Freidberg 1987), this phenomenon is also known from two species of *Mastigolina* (Munro 1929, species recorded as *Camaromyia helva* (Loew), and unpublished observation by A. Freidberg). Little can be added at present regarding this behaviour, except that it possibly indicates closer relationships between the *Sphenella* group in general (and *Cryptophorellia* in particular) and the Trypetinae than between most other Tephritinae and the Trypetinae. Munro's (1925) observation that the puparium is found in the flower is either an error or an unusual case, as noted by him in 1929 and 1935. His observation (1935) that the larvae usually left the flowers by pushing up a plug of dried florets, although some bored a hole in the base of the capitulum to escape, is also interesting, again because of the resemblance of this behaviour to that of Trypetinae, the larvae of which may escape from an infested fruit in almost any direction.

Munro (1925) also observed that when disturbed, the larvae contract almost into a ball. It should be added that according to our observations on larvae of three species, they are all more or less spherical after they leave the flowerheads, even when not disturbed.

Infestation rate of flowerheads of *Senecio erubescens* in Pretoria by *C. peringueyi* reached 80 %, with usually only one larva in each flowerhead, though occasionally two or three (Munro 1935). Parasitisation by chalcids (Munro 1925) and braconids (*Opius phorelliae* Wlksn.; Munro 1935) was recorded, but in our rearings only braconids emerged.

Little can be said about host plants of *Cryptophorellia*, except that they are all species of *Senecio* or the closely related genus *Crassocephalum*. Only two species (*C. peringueyi* and *C. flava*) have actually been reared from known hosts. However, while collecting adults in the field, a few other species have been associated with plants of the above mentioned genera.

Immature Stages

Because of the scarcity of material of immature stages that was available for this study, only third instar larvae and puparia were studied, and the following description should therefore be considered preliminary. The larva is plump, appearing spherical or almost so after escaping from the flowerhead. It is mostly creamy-white, but is darker ventrally due to large and dense patches of dark scales on most segments (Fig. 59d). The cephalopharyngeal skeleton (Fig. 59a) has no

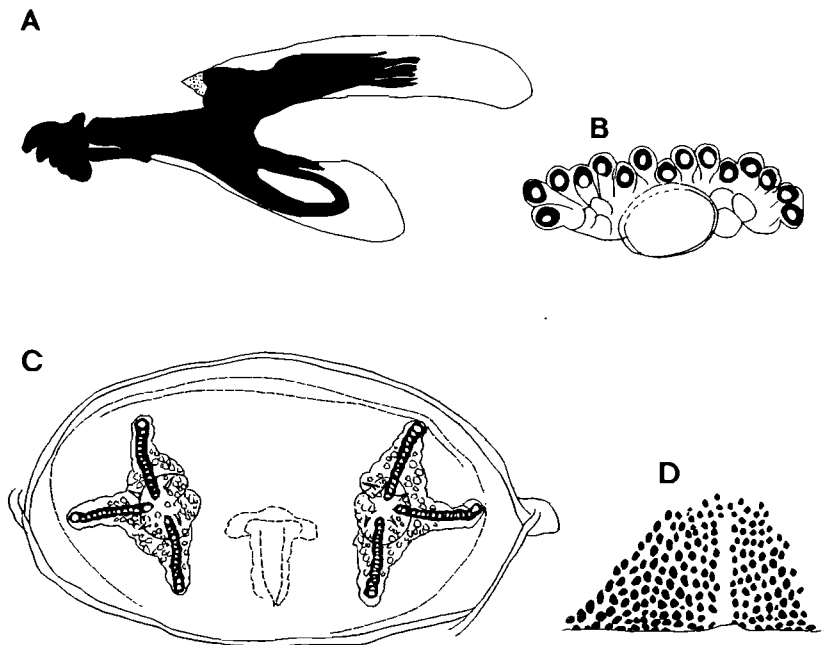


Fig. 59. *Cryptophorellia flava* sp. n., third instar larva. a. Cephalopharyngeal skeleton. b. Anterior spiracle. c. Posterior spiracle. d. Parts of 2 ventral belts of scales.

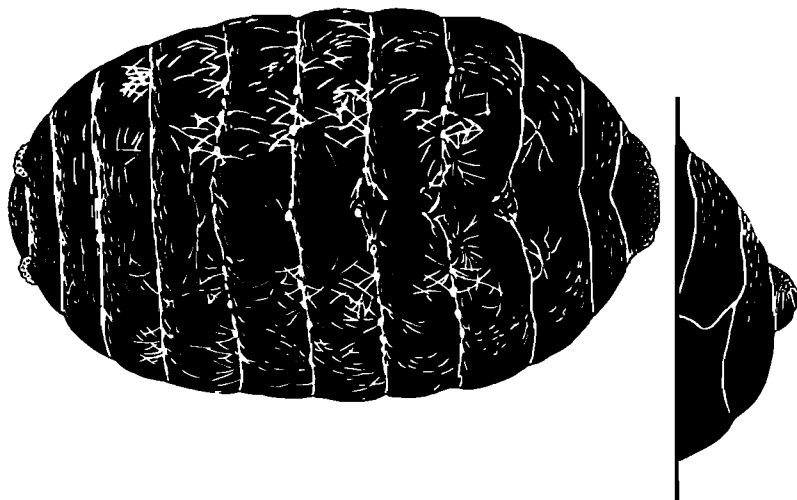


Fig. 60. *Cryptophorellia peringueyi* (Bezzi), puparium.

overt features. The cephalic sense organs have not been studied. The anterior spiracles are normally shaped (Fig. 59b), but each contains a relatively large number of digits (15 in the dissected larva). The posterior spiracles are unusual, having three very elongate and rather linear slits, each composed of many small openings (Fig. 59c). Moreover, two of the slits are aligned almost in a continuation of each other, whereas the third radiates from their meeting point at a right angle to them. This arrangement seems to be unique for *Cryptophorellia* and is not found in the related genera *Sphenella* and *Mastigolina*, the puparia of which were also studied by us.

The puparium is black, slightly shiny, with a delicate sculpture of many thin fissures (Fig. 60). Larval characters, such as the spiracles, are also observable on the puparium. The puparia of all species observed are peculiar in having the posterior spiracular area elevated, usually appearing as a knob, especially in lateral view. The two spiracles are combined via a large transverse flap that is attached dorsally and 'dwindles downwards'. Below this flap and between the spiracles is a rather deep depression. The vertical axes of the two posterior spiracles (taken along the two slits aligned in continuation) are parallel to each other or somewhat divergent dorsally (compare with Fig. 59c).

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